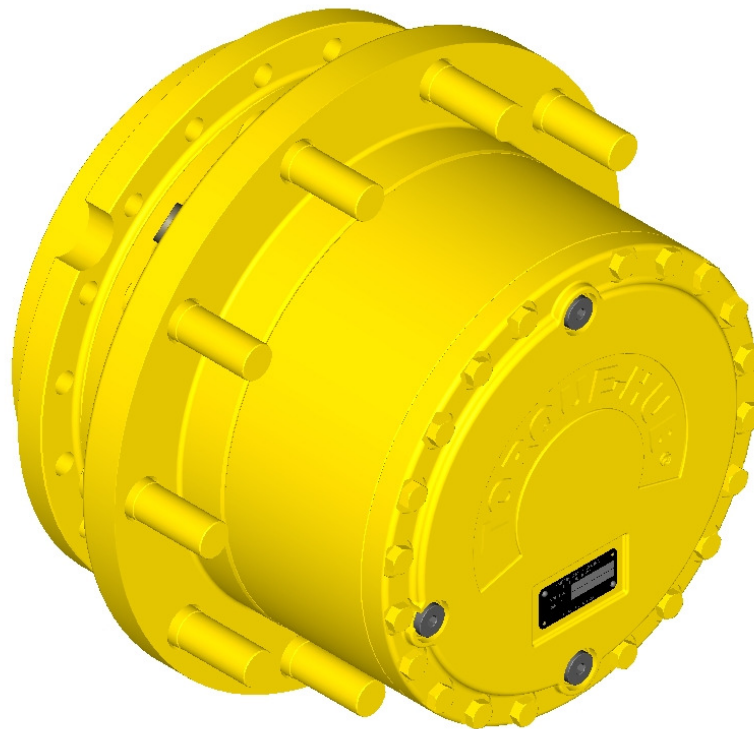




Torque-Hub[®] Planetary Final Drive CW18 Series Service Manual



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Features and specifications are subject to change without notice.

Planetary Final Drive Service Manual

Content

	Introduction	4
	Brake Test	5
	Roll and Leak Test	8
	Tightening and Torquing Bolts	11
	Lubrication Information	12
	Seal Installation Instructions	14
Disassembly Instructions	Main Disassembly	18
	Cover Disassembly	22
	Input Coupling Disassembly	24
	Input Brake Disassembly	26
	Housing-Spindle Disassembly	28
	Output Planet Gear Disassembly	32
	Input Carrier Disassembly	33
Assembly Instructions	Cover Subassembly	36
	Input Carrier Subassembly	38
	Output Planet Gear Subassembly	40
	Input Coupling Subassembly	41
	Housing-Spindle Subassembly	43
	Main Assembly	46
	Assembly Drawing	51
	Parts List	52
	Assembly Tools	54
General Information	Contact Information	70

Planetary Final Drive Service Manual

Introduction

This manual is a step-by-step guide to the disassembly and assembly of the CW18 Torque-Hub® units with ratios of 51:1 or lower. It is designed for the customer or mechanic who is repairing this particular Torque-Hub® model.

Users of this manual should note that each part mentioned is followed by an identification number enclosed in parentheses. These part numbers may be referred to in the Parts List and Assembly Drawing sections of this manual.

Specialized tools used to assemble this unit are noted in the assembly procedures and diagrammed in the Assembly Tools section.

Users should familiarize themselves with the procedures for roll and leak testing, as well as bolt tightening and torquing found on the following three pages before starting any repairs.

Standard safety practices should be followed during the disassembly and assembly procedures described. Safety glasses and safety shoes should be worn, and heavy, heat resistant gloves should be used when handling heated components. Be especially alert when you see the word **CAUTION**. This indicates that a particular operation could cause personal injury if not performed properly or if certain safety procedures are not followed. The word **NOTE** is used to bring attention to certain procedures or helpful hints that will aid in the disassembly and assembly process.

Planetary Final Drive Service Manual

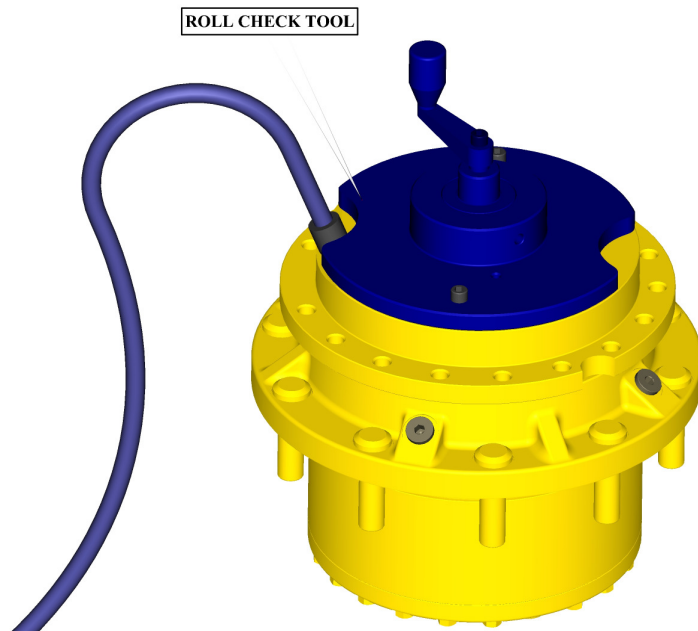
Brake Test

The Brake Test

To perform a brake check, use a M12x1.5 metric fitting. Install a hydraulic hand pump with pressure gauge into brake port in spindle (1A) using metric thread fitting.

Place ROLL TEST Tool (refer to table on page 8) into input coupling.

Apply 25 in-lbs torque. While trying to rotate tool, pump the handle on the hydraulic hand pump and increase the pressure until the brake releases. The brake is released when you are able to rotate the tool.



Record the release pressure. If the brake does not release within limits shown in the brake chart on page 6, check to see if it has the proper number of springs using the **SPRING CHECKING PROCEDURE**. Increase to maximum pressure (refer to brake chart on page 6) and hold at that pressure for one minute. If the brake does not leak or lose pressure, the unit has passed the brake test. If the brake loses pressure, attempt to repair the leak using the leak repair procedure at end of this procedure.

While brake is still released, roll check the unit for one revolution of the output member by rotating the tool. Bleed off pressure slowly while rotating the ROLL TEST Tool.

Record the pressure at which the brake locks up. Using a clean rag, wipe off excess fluid from around the brake port and install the pipe plug.

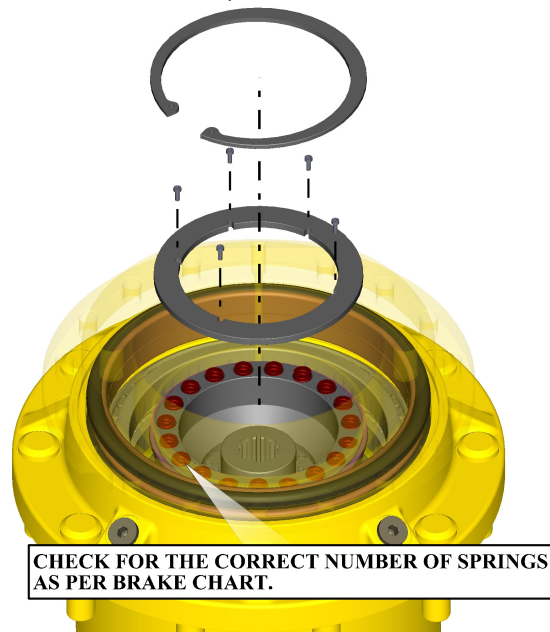
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BRAKE CHART							
9 th DIGIT IN MODEL CODE (INPUT BRAKE)	BRAKE PART NUMBER	NUMBER OF SPRINGS	RELEASE PRESSURE MIN (psi)	RELEASE PRESSURE MAX (psi)	FULL RELEASE PRESSURE (psi)	MAXIMUM PRESSURE (psi)	BRAKE TORQUE (in-lbs)
1	AM902446A	11	100	138	145	3000	3754
2	AM902446B	16	144	182	210	3000	5411
3	AM902446C	19	170	214	250	3000	6386
4	AM902446G	13	118	149	171	3000	4422
J	AM902446A	11	102	129	145	3000	3110
K	AM902446B	16	147	184	210	3000	4481
L	AM902446C	19	174	217	250	3000	5288
M	AM902446G	13	120	151	171	3000	3662
A	902315A	6	92	123	130	3000	2940
B	902315B	9	138	184	190	3000	4410
C	902315	11	168	225	230	3000	5390
G	902315C	7	107	143	150	3000	3430

SPRING CHECKING PROCEDURE:

Install input brake bolts into holes in the brake piston. Tighten bolts in such a way to ensure the brake piston remains straight while being compressed into the brake cavity of the spindle.

Carefully remove the retaining ring from the spindle. Slowly remove bolts from the input brake. Remove the cover plate from the end of the input brake and count the number of springs in brake. If number of springs matches the number in the **BRAKE CHART**, go to the next step. If the number of springs does not match the number in the **BRAKE CHART** above, install the correct number of springs.



Continued on Next Page

Install the Brake Cover Plate using input brake bolts. Tighten screws in such a way that to ensure the Brake Cover Plate remains straight while being compressed into the brake cavity of the spindle.

Install the large retaining ring into the groove in spindle (1A), making sure it is seated properly. Remove all remaining screws from the brake piston and discard.

NOTE: USE CAUTION WHEN REMOVING SCREWS AS THEY ARE SUBJECT TO SPRING PRESSURE. MAKE SURE THE RETAINING RING IS SECURED BEFORE REMOVING BOLTS.

Re-test the input brake. If release and/or lockup pressures still do not match the brake chart, contact the Oerlikon Fairfield service department.

BRAKE LEAK REPAIR PROCEDURE:

Install input brake bolts into holes in the Brake Piston. Tighten screws in such a way to ensure the Brake Cover Plate remains straight while being compressed into brake cavity of Spindle.

Carefully remove the Retaining Ring from the Spindle. Using two eyebolts threaded into opposite holes in the Brake Piston, remove the Brake Piston from the Spindle.

Check O-rings, Backup Rings, and brake cavity in Spindle for damage. If no damage is found, reinstall the Input Brake according to the Input Brake Installation Procedure in the assembly instructions chapter and perform pressure test again. If brake still leaks, contact the Oerlikon Fairfield service department.

Reference: Sample Model CW18____X____. The 'X' is the brake option (Model Code). Consult Oerlikon Fairfield for other brake options.

NOTE: Failure to perform this test may result in damaged or ineffective brake parts.

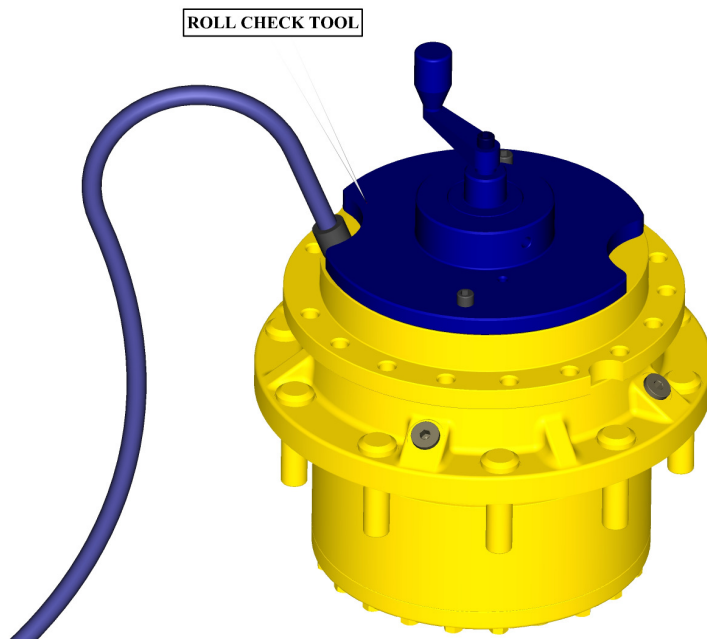
Planetary Final Drive Service Manual

Roll and Leak Test

Torque-Hub® units should always be roll and leak tested before disassembly (if possible) and after assembly to make sure the unit's gears, bearings and seals are working properly. The following information briefly outlines what to look for when performing these tests.

The Roll Test

The purpose of the roll test is to determine if the unit's gears are rotating consistently, easily and properly. It should be able to rotate the gears in the unit applying *constant* force to the roll checker. If more drag is felt in the gears only at certain points, then the gears are not rolling consistently and easily and should be examined for improper installation or defects. Some gear packages roll with more difficulty than others. Do not be concerned if the gears in the unit seem to roll hard as long as they roll with *consistency*. Rotate the gearbox both clockwise and counterclockwise the same number of turns as the ratio of the unit. The gearbox ratio is the same number as the last three numbers on the ID tag.

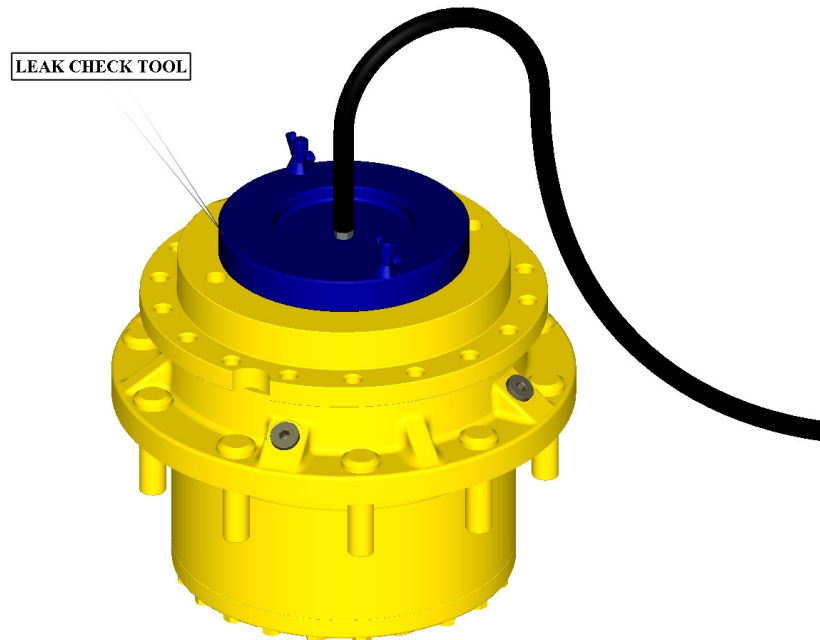


Model Code	Roll Test Tool
CW18Ax1xxx	T184729
CW18Dx1xxx	T184729
CW18Dx2xxx	T180149
CW18Dx4xxx	T180149
CW18Dx8xxx	T180149

Model Code	Roll Test Tool
CW18Ex1xxx	T184729
CW18Ex2xxx	T180149
CW18Ex4xxx	T180149
CW18Ex7xxx	T201476
CW18Ex8xxx	T205279

The Leak Test

The purpose of a leak test is to make sure the unit is airtight. To perform a leak test, use the leak test fixture from the table on page 10. If the tool is not available, the gearbox must be sealed to perform the test. This can be accomplished by assembling the sealed input device onto the gearbox at the input end and replace one of the oil plugs with an air chuck. DO NOT EXCEED 10 PSI PRESSURE DURING THE LEAK TEST. Higher pressure will create a false sealing effect in assemblies with lip-seals. The unit has a leak if the pressure gauge reading on your leak check fitting starts to fall after the gearbox has been pressurized and allowed to equalize. Leaks will most likely occur at the pipe plugs, the main seal or wherever o-rings or gaskets are located. The exact location of a leak can usually be detected by brushing a soap and water solution around the main seal and where the o-rings or gaskets meet on the exterior of the unit and then checking for air bubbles. If a leak is detected in a seal, o-ring or gasket, the part must be replaced and the unit rechecked. Leak test at 10 psi for 20 minutes.



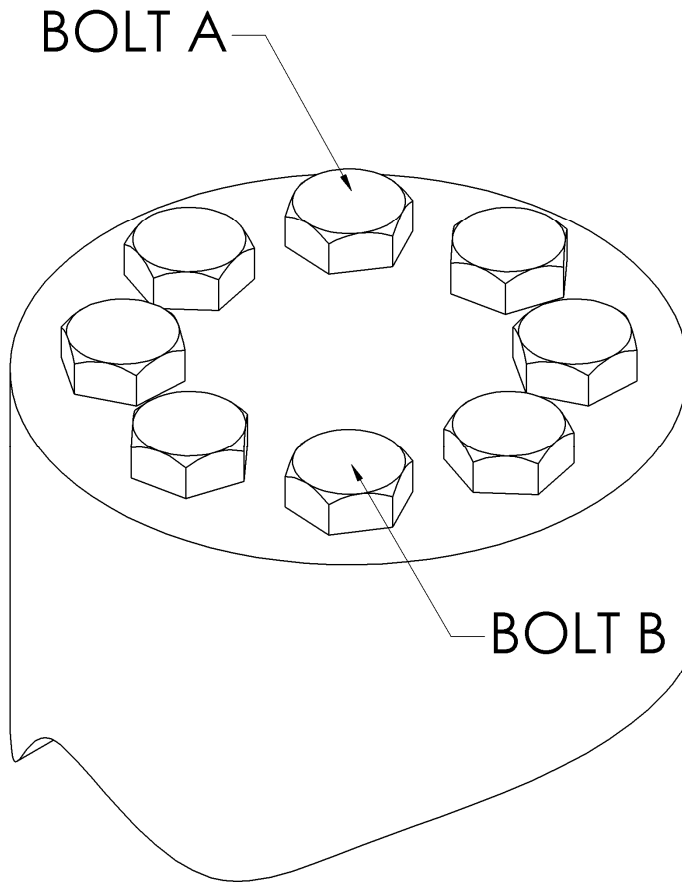
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Model Code	Leak Test Tool
CW18A11xxAxxx	T182969
CW18A11xxZxxx	T188489
CW18D11xxAxxx	T188489
CW18D12xx4xxx	T181663
CW18D14xxBxxx	T184035
CW18D18xx4xxx	T198122
CW18D21xxAxxx	T188489
CW18E11xxAxxx	T188489
CW18E11xx4xxx	T188489
CW18E12xx4xxx	T181663
CW18E14xxBxxx	T184035
CW18E17xx8xxx	T163056
CW18E18xx4xxx	T198122
CW18E54xxBxxx	T184035

Planetary Final Drive Service Manual

Tightening and Torquing Bolts

If an air impact wrench is used to tighten bolts, extreme care should be taken to ensure the bolts are not tightened beyond their specified torque. The following steps describe how to tighten and torque bolts or socket head cap screws in a bolt circle.



1. Tighten (but do not torque) bolt "A" until snug.
2. Go to the opposite side of the bolt circle and tighten bolt "B" until equally snug.
3. Crisscross around the bolt circle and tighten the remaining bolts.
4. Use a torque wrench to apply the specified torque to bolt "A."
5. Using the same sequence, crisscross around the bolt circle and apply an equal torque to the remaining bolts.

Planetary Final Drive Service Manual

Lubrication Information

General Properties

The lubricant used in most Torque-Hub® drives should be petroleum-based gear fluid containing anti-oxidation, anti-foaming and extreme pressure additives. The lubricant should have a minimum viscosity index of 95 cst and maintain a minimum viscosity of 40 cst under normal operating conditions. Some applications require special considerations; consult the machine manufacturer and Oerlikon Fairfield for more additional information.

The table below lists the recommended viscosities for various ambient operating temperatures. These recommendations are based on temperature rise of 50° to 100°F at normal operating conditions.

Differential Planetary			Simple Planetary	
Ambient Temperature	ISO Index	AGMA Lubricant Number	ISO Index	AGMA Lubricant Number
-40° to -5° F ⁽¹⁾	VG100	3EP	VG100	3EP
-5° to 40° F	VG150	4EP	VG100	3EP
40° to 105° F	VG220/VG320	5EP/6EP	VG150/VG220	4EP/5EP
105° to 150° F ⁽²⁾	VG460	7EP	VG320	6EP
Footnotes 1. For operation in this ambient temperature range, synthetic oil is recommended with a pour point of 10°F lower than the minimum ambient temperature. 2. For operation in this ambient temperature range, synthetic oil is recommended for proper lubricant life at elevated temperatures.				

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Maintenance

Oil amounts for each series of Torque-Hub[®] drives are indicated in the appropriate series literature. An initial oil change should be made after the first 50 hours of operation. Subsequent oil changes should be made at 1,000 hour intervals or annually, whichever comes first.

Oil temperatures should be not higher than 160° to 180°F for continuous operation, and no higher than 200°F for intermittent operation. For special applications, high horsepower, high speeds or wide temperature changes, please consult Oerlikon Fairfield.

Oil Fill Level

When the Torque-Hub[®] unit is mounted horizontally, unless otherwise specified, the gearbox should be filled half-full of oil. Consult the appropriate series literature for approximate fill volumes. Vertically mounted Torque-Hub[®] units may require special lubrication procedures. Please contact Oerlikon Fairfield for vertically mounted applications.

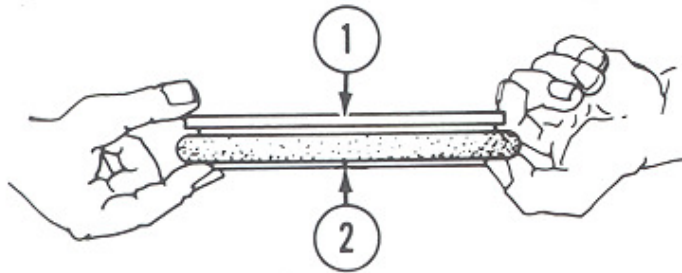
Planetary Final Drive Service Manual

Seal Installation

The seal installation tool can be purchased from MORCOR LTD at Sales@MORCORLTD.com part number MGT045.

To begin the procedure, all of the sealing components; Seal Rings (metal rings); O-Rings and the housings must be clean and free of Oil, Grease, Dirt or Dust. Always check to make sure that there are no nicks or burrs in the housing area that could damage the Load Ring during installation. The use of DENATURED ALCOHOL (also known as Wood Alcohol or Shellac Thinner) and a lint free cloth is recommended for cleaning all of these areas. **NOTE:** Follow all Material Safety Data Sheet guidelines.

After all components have been wiped clean and have dried, the O-Rings should be placed back on the Seal Rings in their proper position. The O-Rings must be seated completely and tightly on the Seal Ring. Always make sure that the O-rings are not twisted or distorted by inspecting the mold flash (seam) on the outside diameter to see that is running “true” with the circumference.

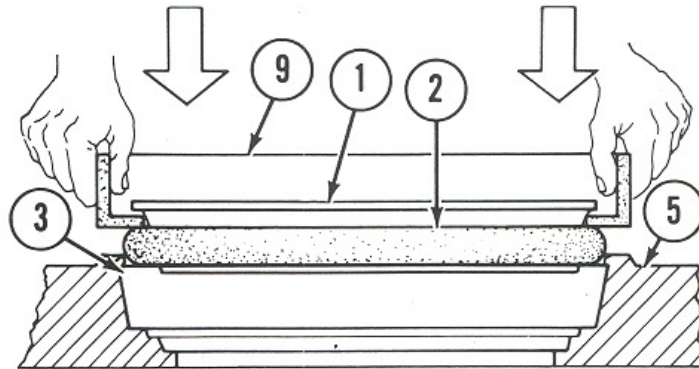


Eliminate O-Ring twist by gently pulling a section of the O Ring (2) rapidly away from the Seal Ring (1) and letting it “snap” back.

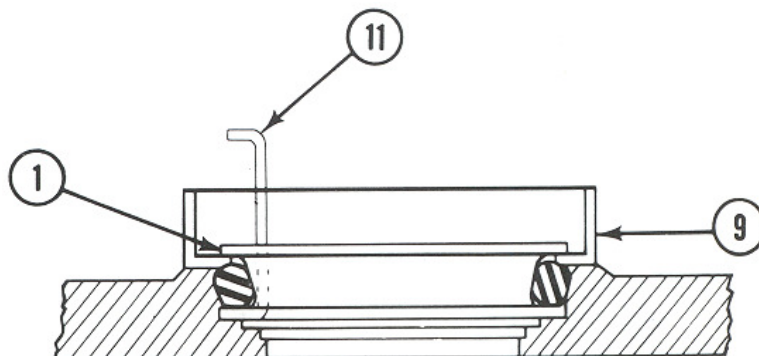
Warning: Do not place the Seal Rings face down on any hard or abrasive surface to accomplish this! Once the O-Rings are back on the Seal Rings, quickly swab out the housing with a clean lint free cloth generously soaked it with Denatured Alcohol. This is to temporarily lubricate the bore. Then, with the same cloth, quickly swab the outside (O- Ring area) of the seal half to temporarily lubricate the O-Ring.

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With all surfaces of the O Ring (2) wet with alcohol use the Installation Tool (9) to position the Seal Ring (1) and the O-Ring (2) squarely against the Housing (5) as shown. Use sudden and even pressure to pop (push) the Toric Ring under the Retaining Lip (3) of the housing.



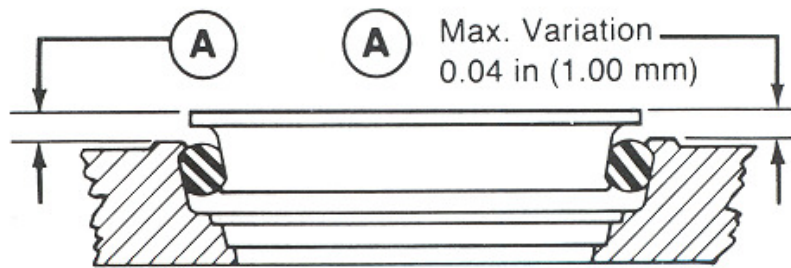
NOTE: It is important for the O-ring as well as the housing bore to be wet with Alcohol during this process. Visually inspect the positioning of the O-Ring and Seal Ring relative to each other, as well as relative to the housing. Always make sure that everything is seated symmetrically. **NOTE:** Misaligned seals and improperly seated O-Rings can cause leakage or premature failure.



If small adjustments are necessary; do not push directly on the Seal Ring (1) use the Installation tool (9) to push down or use the Adjustment Tool (11) to pull up. **NOTE:** Never use sharp instruments such as screwdrivers. They can cause permanent damage to the O-Ring and/or Seal Ring, which may lead to rapid failure. For twists or obvious bulges in the O-Ring or if the Seal Ring is "riding up" on the O-Ring and cannot be adjusted, always remove the seal half and repeat the procedure, beginning with the cleaning process.

Continued on Next Page

After a successful installation always wait a few minutes for the Alcohol to completely evaporate, before assembling. The Alcohol is necessary as a lubricant during the installation process, but for assembly the area must be clean and dry in order for the O- Ring to properly "crush" into its final position. After the two seal halves have been installed in their respective housings and just prior to assembly, the faces should be thoroughly cleaned with Denatured Alcohol. Next, apply a thin film of oil (EP90 the same oil that will be used to fill the assembly) to the faces of the Seal Rings with a clean lint free cloth. Warning: Be careful not to get oil on the O- Rings! The seal set is now ready to be drawn together in the assembled unit.

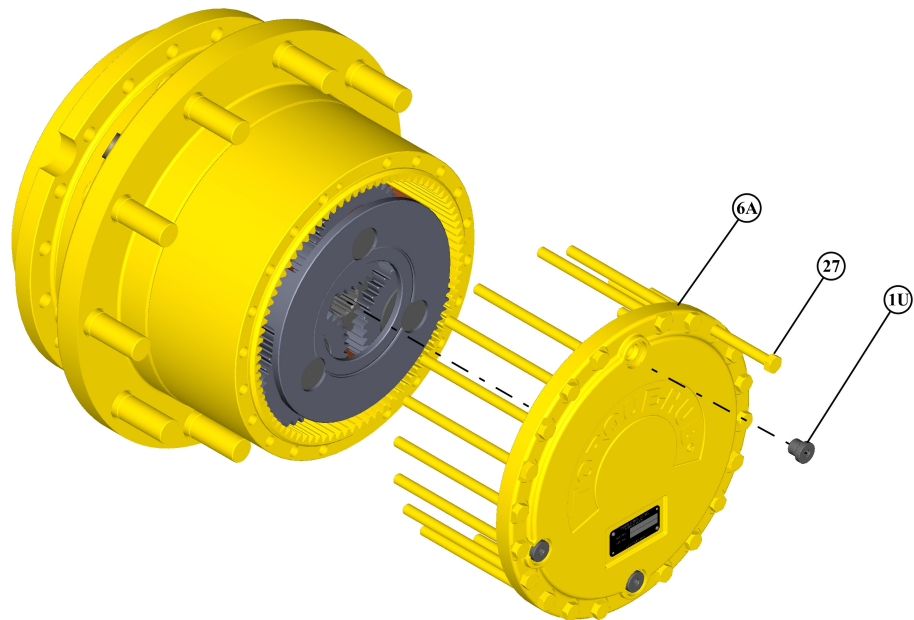


Check the assembled height (A) in a least four places spaced 90° apart.

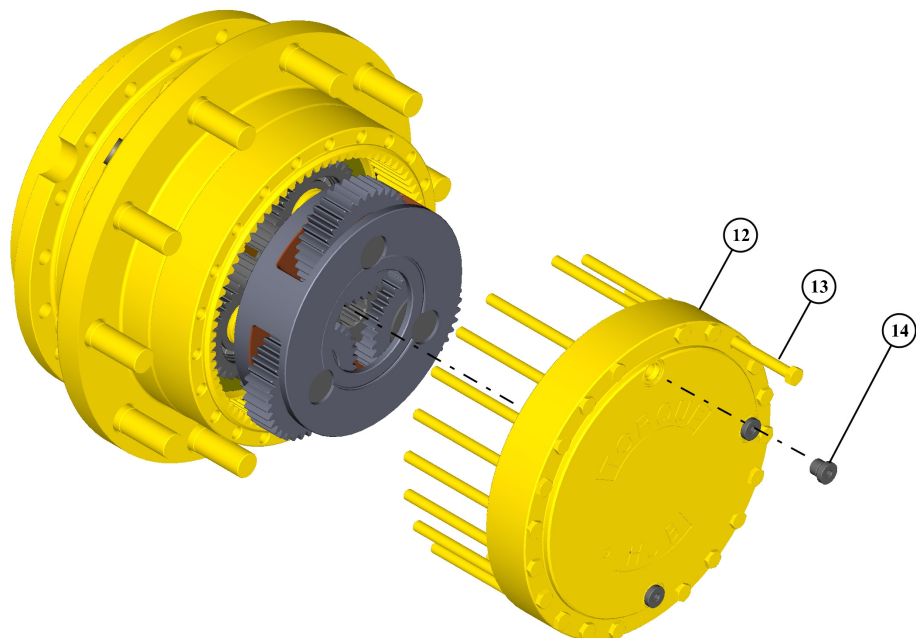
DISASSEMBLY

Planetary Final Drive Service Manual

Main Disassembly



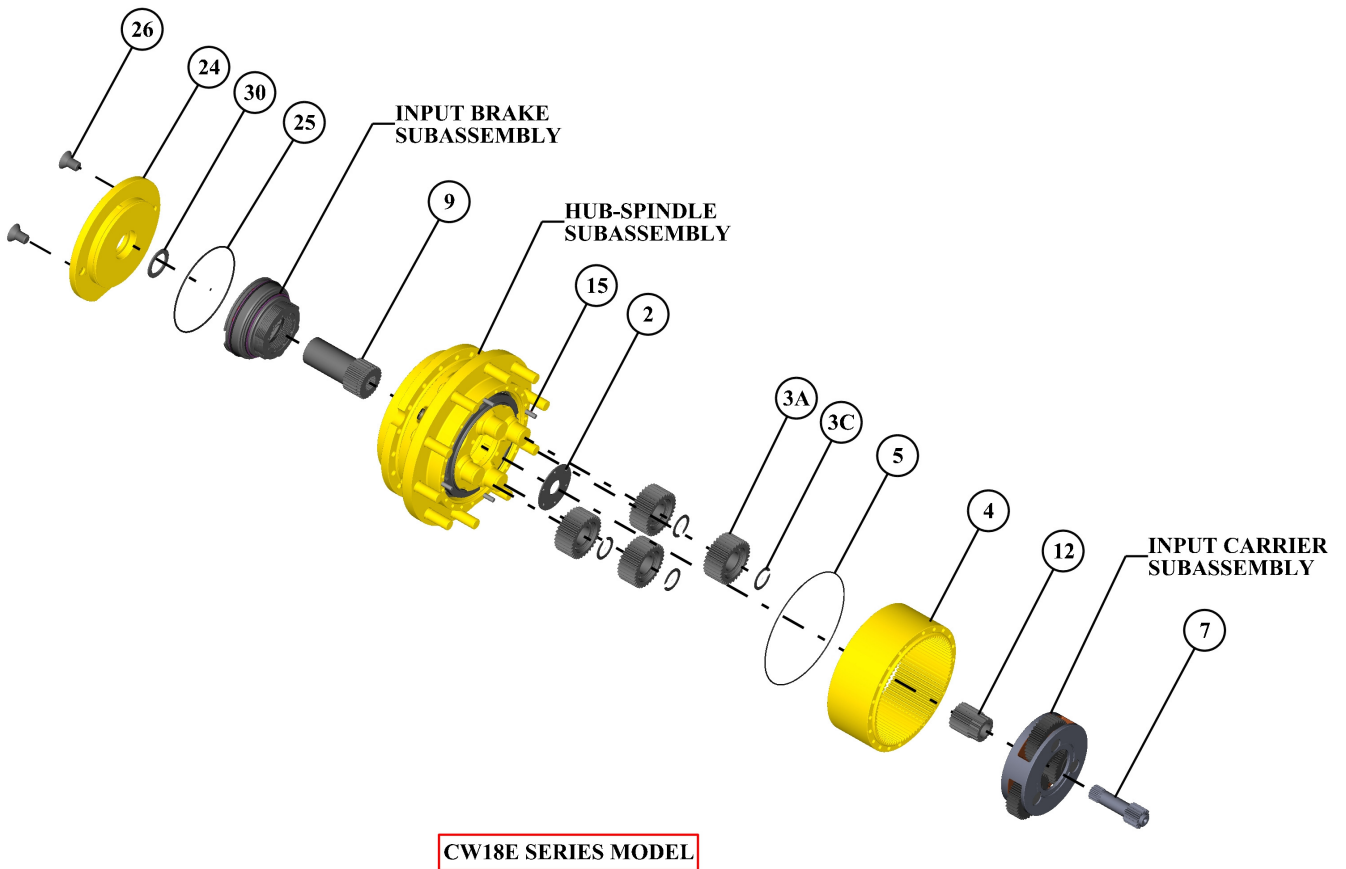
CW18E SERIES MODEL



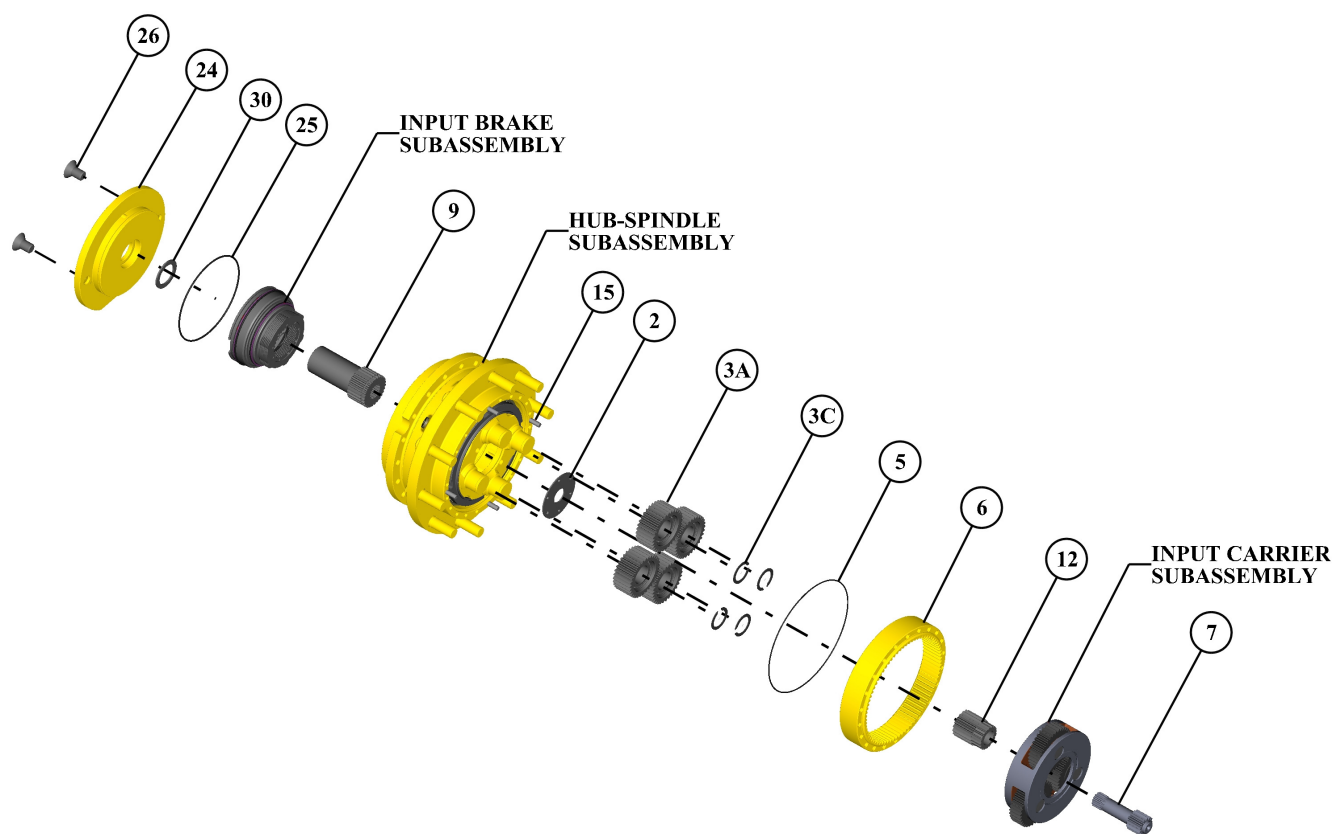
CW18A & CW18D SERIES MODEL

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1. Perform a roll check and a leak check prior to disassembling the unit.
2. Remove the three magnetic Pipe Plugs (1U/14) and drain the oil out of the gearbox.
NOTE: Record the condition and volume of the oil.
3. Remove Bolts (27/13) from the Cover Subassembly.
4. Lift the Cover Subassembly off of the unit.



Continued on Next Page



CW18A & CW18D SERIES MODEL

5. Remove the Input Shaft (7) if applicable.
6. Lift out the Input Carrier Subassembly from Hub-Spindle Subassembly.
7. Remove the Second Stage Sun Gear (12).
8. Lift the Ring Gear (4/6) off of the Housing Spindle Subassembly.
9. Remove the O-ring (5) from between the Housing (1G) and the Ring Gear (4/6).

CAUTION: Safety glasses must be worn during these next steps.

10. Remove the four External Retaining Rings (3C) that are holding the spindle Planet Gears (3A) in place.
11. Carefully pry the Planet Gears (3A) off of the spindle posts. Be careful to not damage the Thrust Spacer (2).
12. Remove Thrust Spacer (2) from Housing Spindle Subassembly.

NOTE: Skip steps 13, 14 and 15 if unit does not have Adaptor Mount (24).

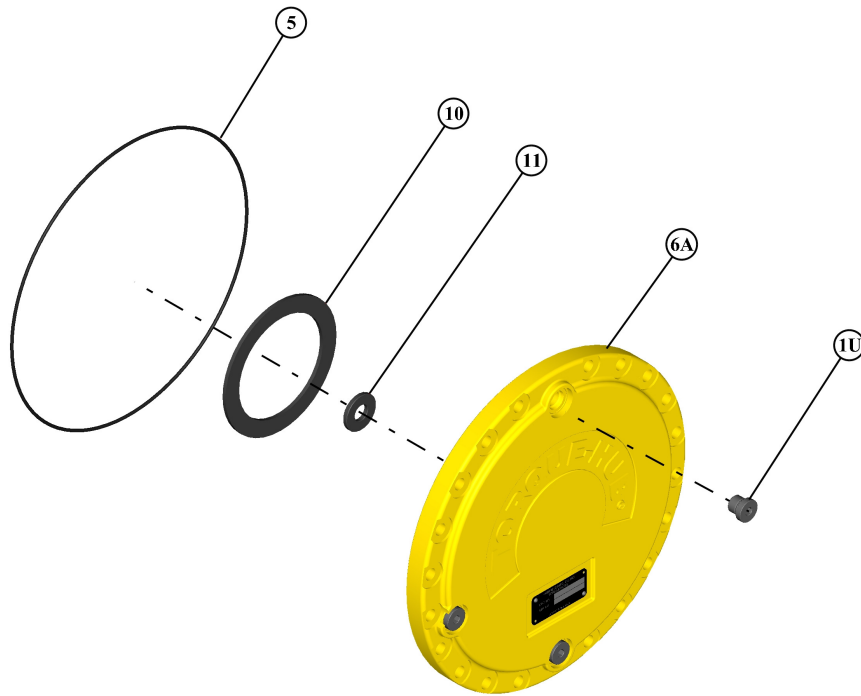
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13. Remove Adaptor Mount (24) from Housing Spindle Subassembly by uninstalling Bolts (26).
NOTE: Skip step 14, if Thrust Washer (30) is glued onto Adaptor Mount (24)
14. Remove Thrust Washer (30) from Adaptor Mount (24).
15. Remove O-Ring (25) from groove in Adaptor Mount (24) and discard O-Ring.
16. Remove the Input Brake Subassembly out of Hub-Spindle Subassembly (Refer page 26 for Input Brake Disassembly).
17. Remove the Input Coupling Subassembly (9) out of Hub-Spindle Subassembly.

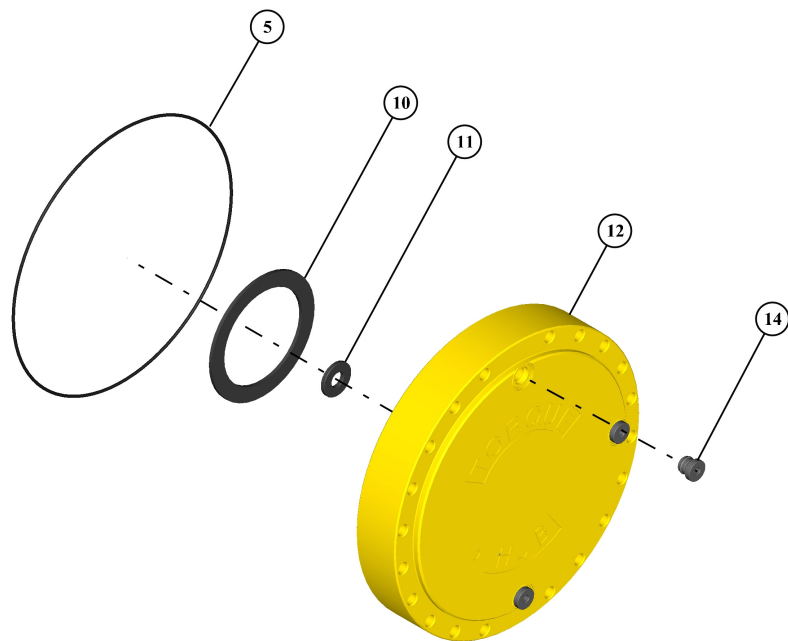
This concludes the Main Disassembly.

Planetary Final Drive Service Manual

Cover Disassembly



CW18E SERIES MODEL COVER SUBASSEMBLY



CW18A & CW18D SERIES MODEL COVER SUBASSEMBLY

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1. Remove the O-Ring (5) from groove in the Cover (6A/12) and discard O-Ring.

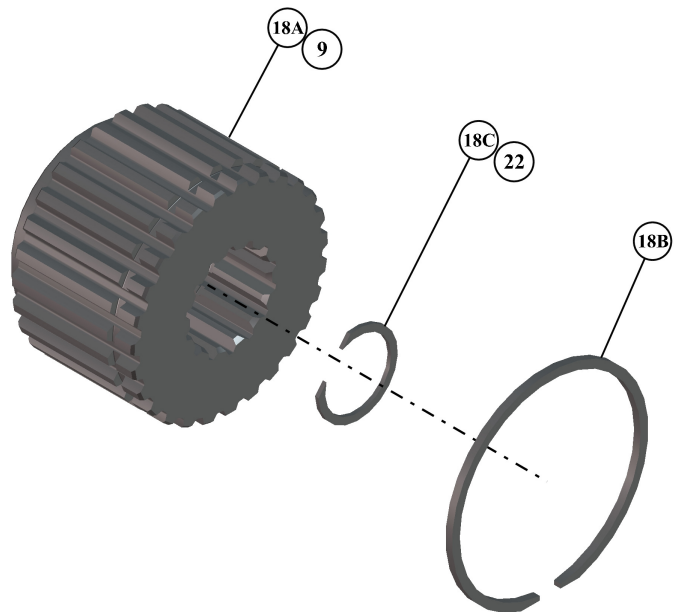
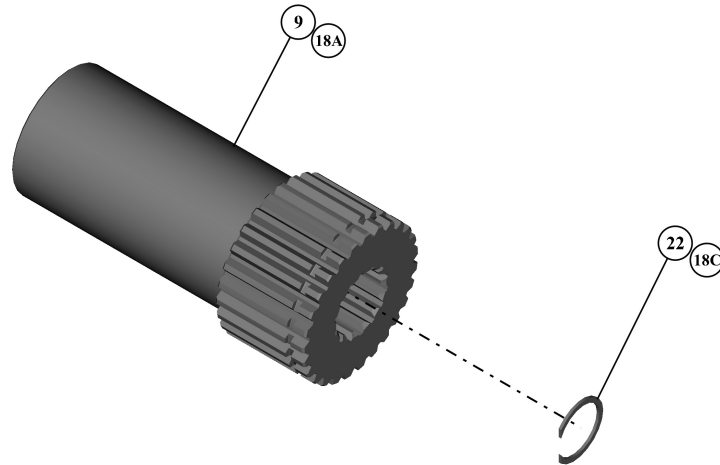
NOTE: Skip step below if the unit has Thrust Washers glued in place.

2. Remove Thrust Washers (10) and (11) from pockets in the Cover (6A/12).

This concludes the Cover Disassembly.

Planetary Final Drive Service Manual

Input Coupling Disassembly



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CAUTION: Safety glasses must be worn during these next step.

1. Remove Retaining Ring (22/18C) from bore of Coupling (9/18A).

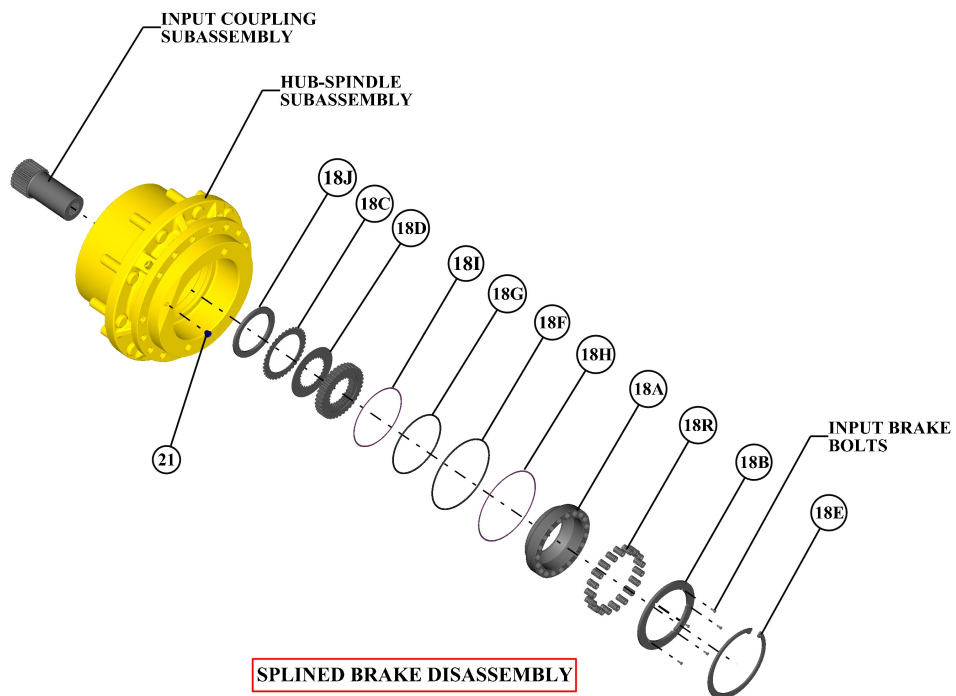
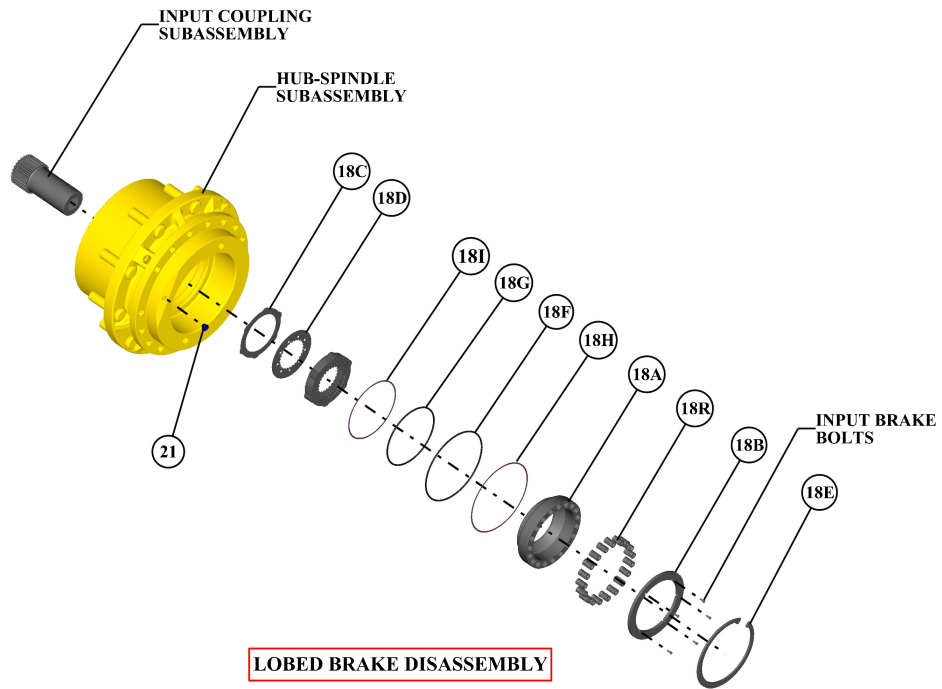
NOTE: Skip step 2 for Assembly with Adaptor Mount.

2. Remove Retaining Ring (18B) from retaining ring groove of Coupling (9/18A).

This concludes the Input Coupling Disassembly.

Planetary Final Drive Service Manual

Input Brake Disassembly



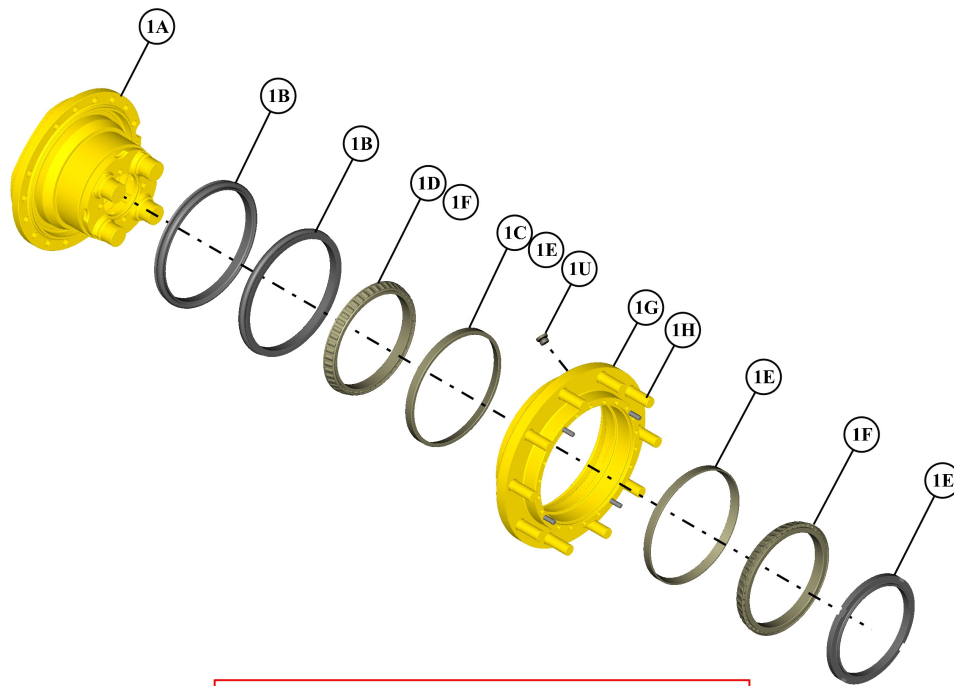
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1. Remove Input Coupling Subassembly from the unit.
2. Place Spindle (1A) such that the flange side is up.
CAUTION: Safety glasses must be worn during these next steps.
3. Install the Input Brake Bolts through the Thrust Plate (18B) and into the Brake Piston (18A) and tighten incrementally to compress the brake springs (18R) and take pressure off of the Retaining Ring (18E).
4. Remove the Retaining Ring (18E) from counter bore of the Spindle (1A).
5. Remove the Input Brake Bolts from the Brake Piston (18A) incrementally to release the tension off the springs slowly.
6. Remove the Brake Thrust Plate (18B).
7. Remove the Brake Springs (18R) from the Brake Piston (18A).
8. Remove the Brake Piston (18A) out of the Spindle (1A).
9. Remove the Backup Ring (18H) and the O-ring (18F) from grooves in the Spindle (1A).
10. Remove the Backup Ring (18I) and the O-ring (18G) from grooves in the Spindle (1A).
11. Remove the Stators (18D) and Rotors (18C) from the spindle counter bore.
12. Remove Plastic Plug (21) from Spindle (1A) if applicable.
13. Remove Spacer (18J) from the spindle (1A), applicable for Splined Brake Assembly only.

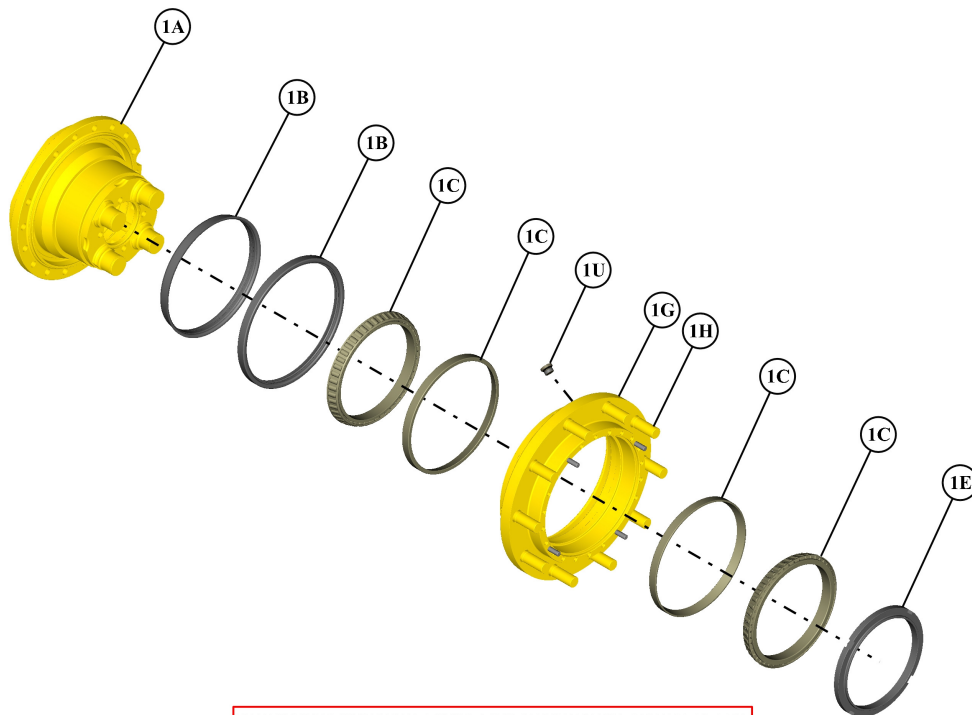
This concludes the Input Brake Disassembly.

Planetary Final Drive Service Manual

Housing-Spindle Disassembly



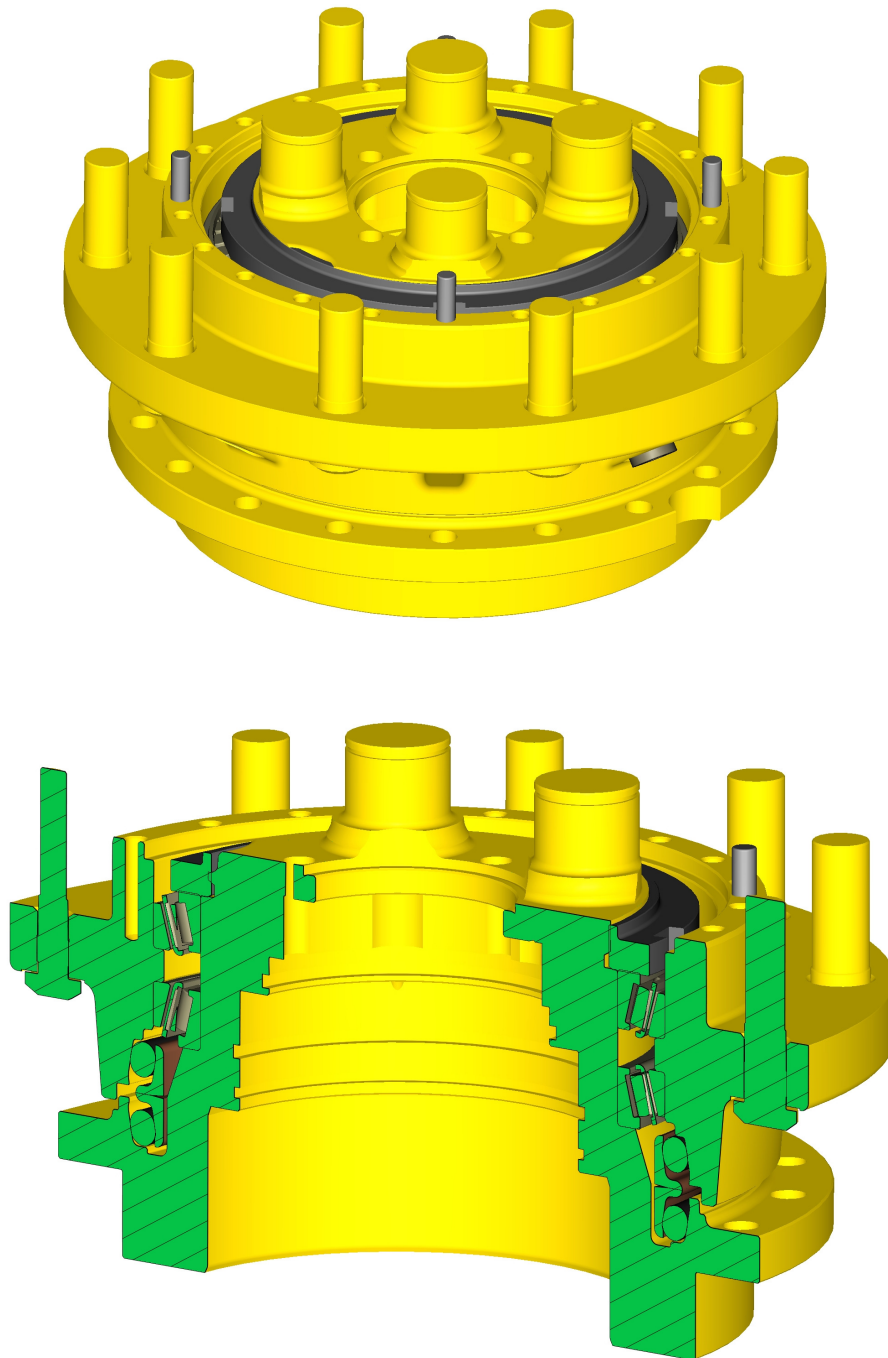
HOUSING SPINDLE SUBASSEMBLY WITH FACE SEAL



HOUSING SPINDLE SUBASSEMBLY WITH LIP SEAL

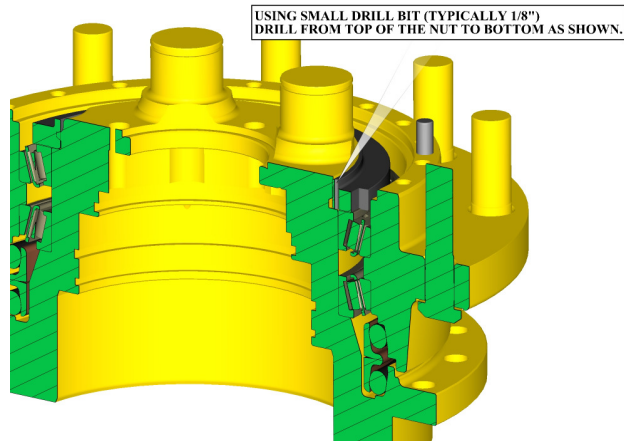
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1. Set the unit on a bench so that the Spindle (1A) flange is down.

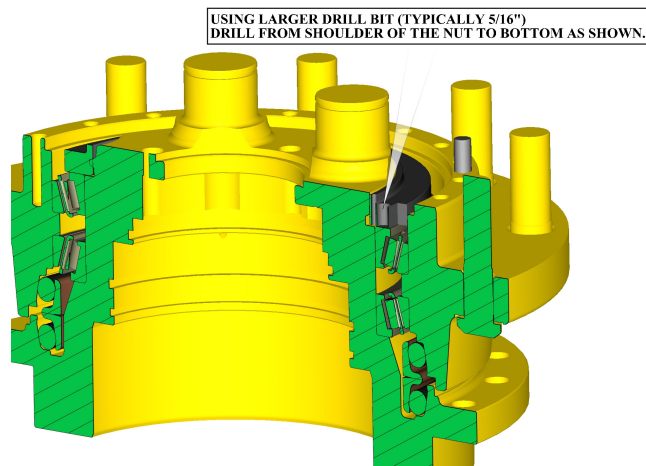


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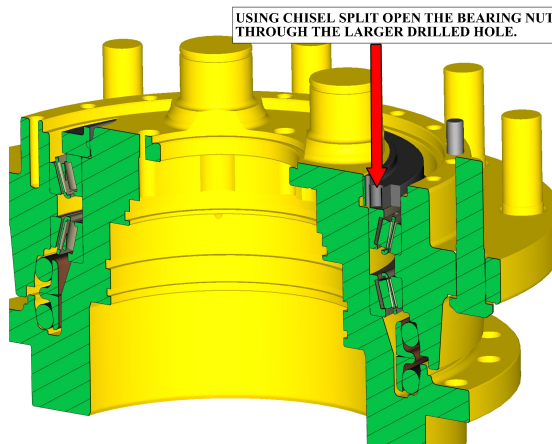
2. Using a small drill bit (typically 1/8"), drill from the top of the bearing nut to the bottom as shown below.



3. Using a larger drill bit (typically 5/16"), drill the bearing nut from the shoulder of the bearing nut to the bottom as shown below.

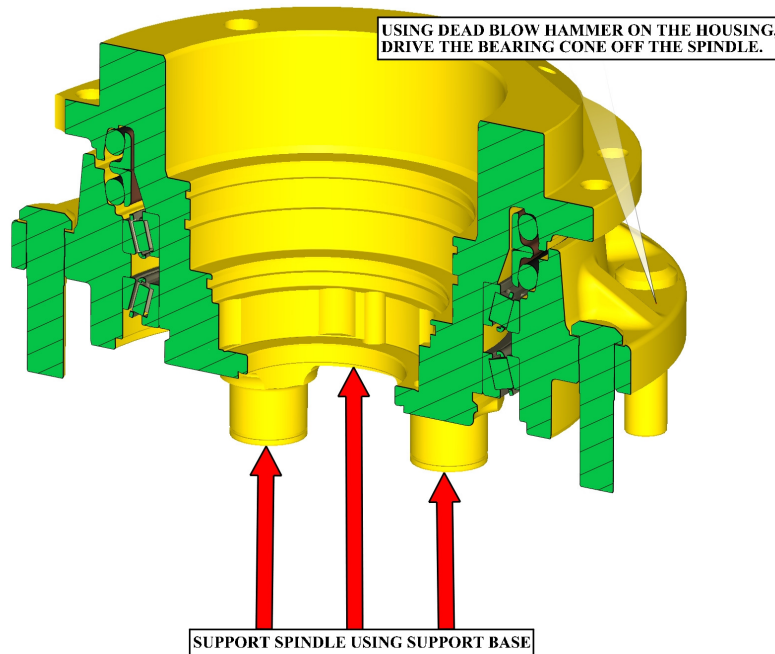


4. Using a chisel, split open the bearing nut through the larger drilled bore as shown below.



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5. Remove Bearing Nut (1E) out of Hub-Spindle Subassembly.
6. Discard Bearing Nut (1E). A new locknut must be used for reassembly.
7. Turn the unit over and carefully place the unit on a support base until the Spindle (1A) rests on it. Ensure there is enough gap to lower the Housing (1G) down.

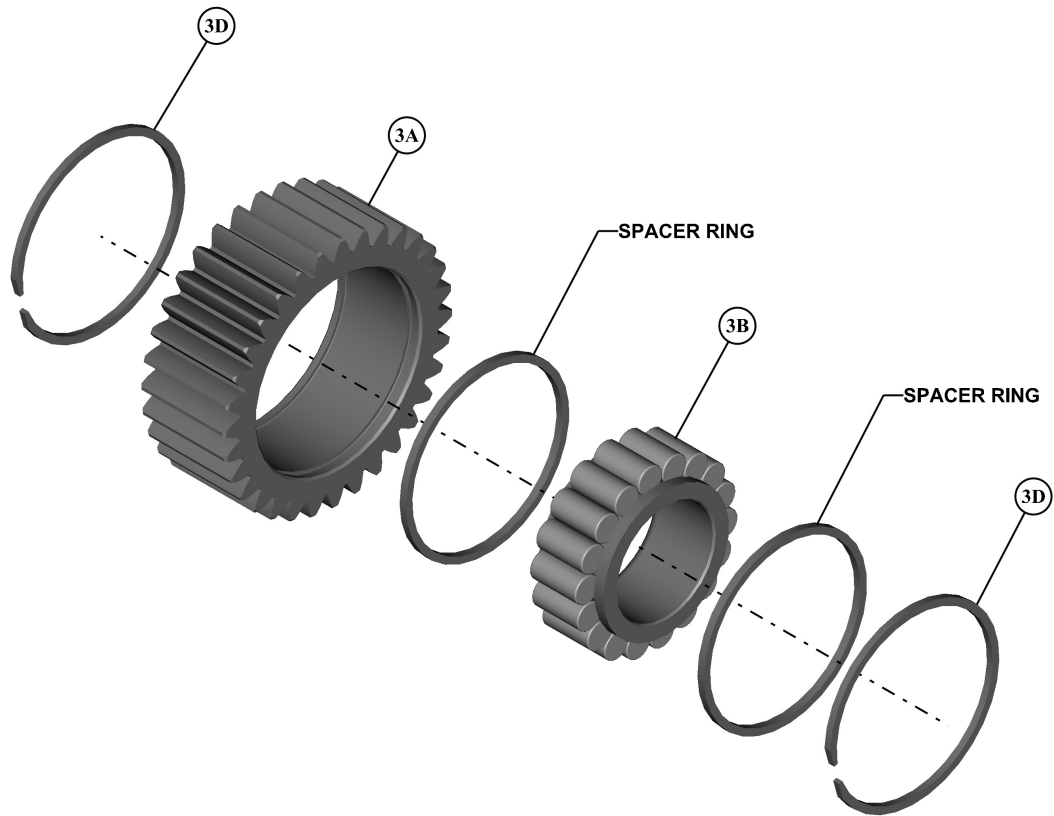


8. Use a dead blow hammer on the Housing (1G) flange to drive the inboard Bearing Cone (1F) off of the Spindle.
9. Lift the Spindle (1A) out of the Housing (1G).
10. Remove the Face Seal (1B) halves or Outer of Lip Seal (1B) from the Housing (1G).
11. Remove the Bearing Cone (1D/1F) from the Spindle (1A).
12. Remove the Bearing Cone (1C) from the Spindle (1A).
13. Using a hammer and punch drive the inboard Bearing Cup (1C/1E) out of the Housing (1G). Be careful not to damage the counter bore in the housing.
14. Turn the Housing (1G) over and drive the outboard Bearing Cup (1E) out of the Housing. Be careful not to damage the counter-bore in the housing.
15. Remove the other Face Seal (1B) half or the remaining inner sleeve of Lip Seal (1B) from the Spindle (1A).

This concludes the Housing-Spindle Disassembly.

Planetary Final Drive Service Manual

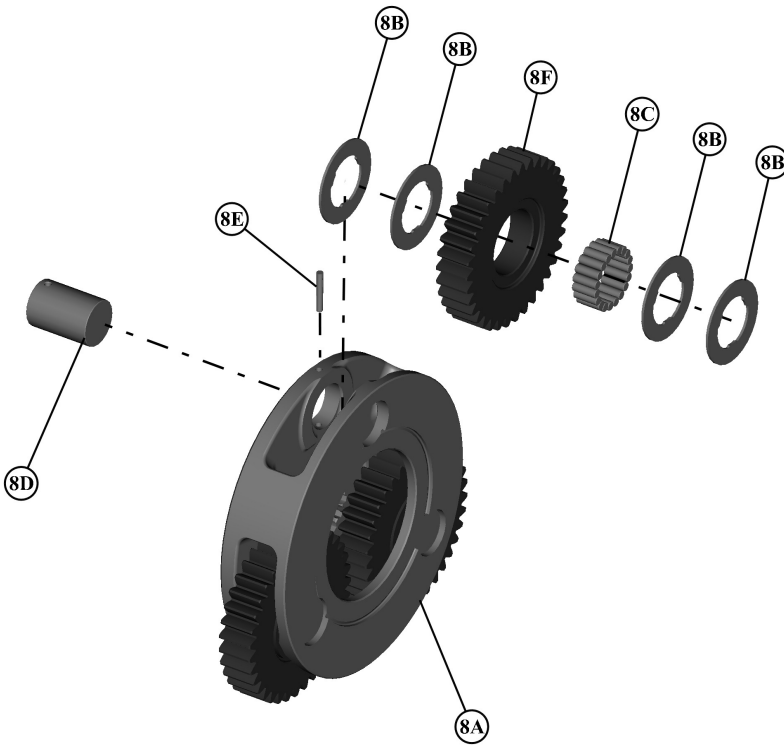
Output Planet Gear Disassembly



1. Place the Planet Gear Sub Assembly on bench.
- CAUTION: Safety glasses must be worn during this next steps.**
2. Remove the upper Retaining Ring (3D) from groove of the Planet Gear (3A).
3. Remove Spacer Rings from either side of the Roller Bearing Assembly (3B).
4. Remove the Roller Bearing assembly (3B) and carefully slide into a snug fitting tube.
5. Remove the lower Retaining Ring (3D) from groove of the Planet Gear (3A).

This concludes the Output Carrier Disassembly.

Input Carrier Disassembly



1. Drive the Planet Shaft (8D) out of the Carrier (8A) pin holes; forcing the Roll Pin (8E) to shear off.
2. Hold on to the Planet Gear (8F) and push the Planet Shaft (8D) out of the Carrier (8A). The Thrust Washers (8B) will slide off the shaft as it is removed.
3. Using a hammer and punch, drive the Roll Pin (8E) out of the Planet Shaft (8D) and Carrier (8A).
4. Remove the Needle Bearings (8C) from the inside of the Planet Gear (8F).
5. Repeat steps 1-4 for the remaining two Planet Gears (8F).

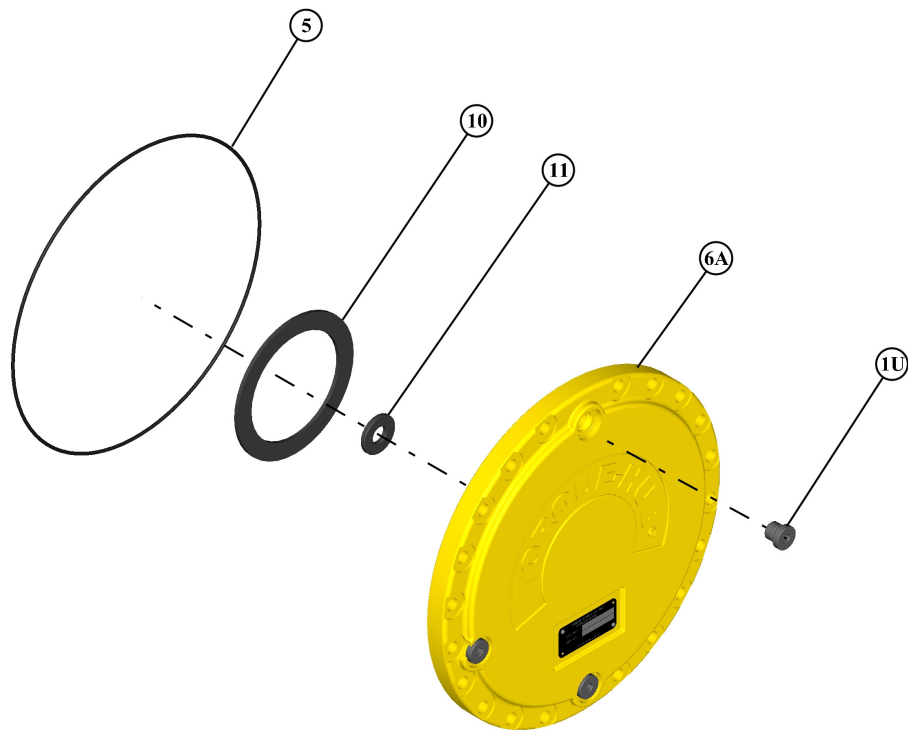
This concludes the Input Carrier Disassembly.

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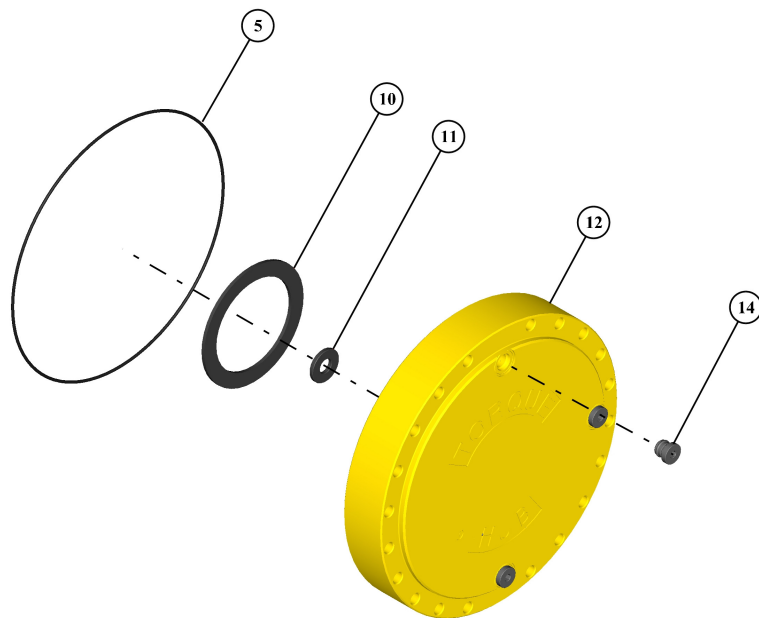
ASSEMBLY

Planetary Final Drive Service Manual

Cover Subassembly



CW18E SERIES MODEL COVER SUBASSEMBLY



CW18A & CW18D SERIES MODEL COVER SUBASSEMBLY

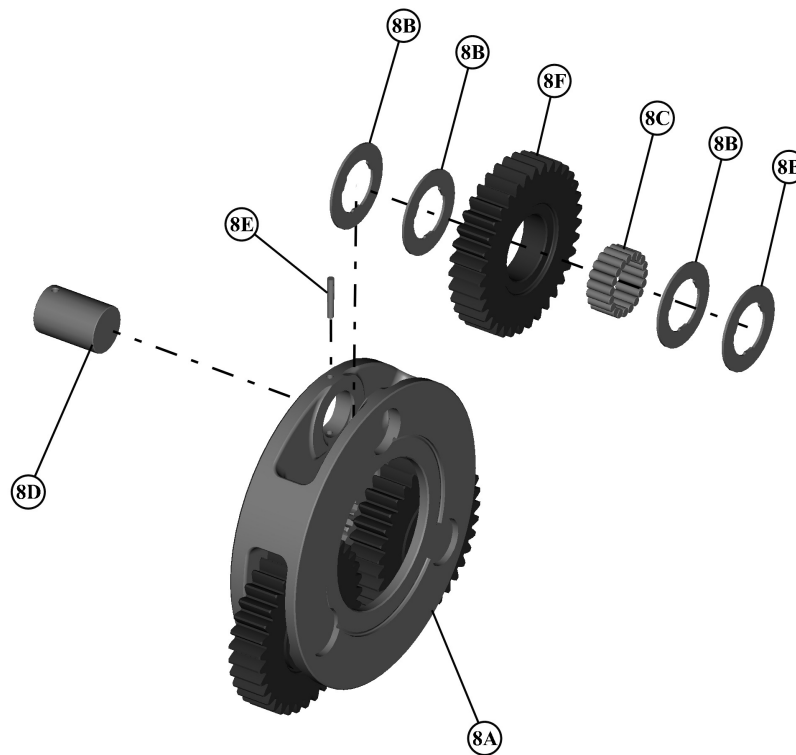
Continued on Next Page

1. Install three Pipe Plugs (1U/14) into the Cover (6A/12).
2. Grease the O-ring (5) and place it in the groove in the Cover (6A/12).
NOTE: Skip step below if the unit has Thrust Washers glued in place.
3. Place the Thrust Washers (10) and (11) into counter bore of Cover (6A/12) using grease to hold it in place.

This concludes the Cover Subassembly.

Planetary Final Drive Service Manual

Input Carrier Subassembly



1. Apply a liberal coat of grease to the bore of the Planet Gear (8F). This will enable the Needle Rollers (8C) to be held in place during assembly.
2. Install Needle Rollers (8C) into the bore of each of the three Planet Gears (8F).
NOTE: The last roller installed must be installed end wise. That is, the end of the last roller must be placed in between the ends of the two rollers that form the space, and then slide parallel to the other rollers into place.
3. Place the Carrier (8A) into the tool fixture so that one of the roll pin holes is straight up.
4. Start Planet Shaft (8D), with end opposite roll pin hole first, through the planet shaft hole in Carrier (8A), making sure that the roll pin hole in the planet shaft is straight up.
5. Using ample grease to hold them in position, slide four Washers (8B) onto the Planet Shaft (8D).
6. Place the Planet Gear (8F) into position and push the Planet Shaft (8D) through the planet gear without going all the way through carrier.

Continued on Next Page

7. Finish pushing the Planet Shaft (8D) into the Carrier (8A) until roll pin holes of Planet Shaft and Carrier are aligned. If necessary, align roll pin holes using a 1/8" diameter punch.

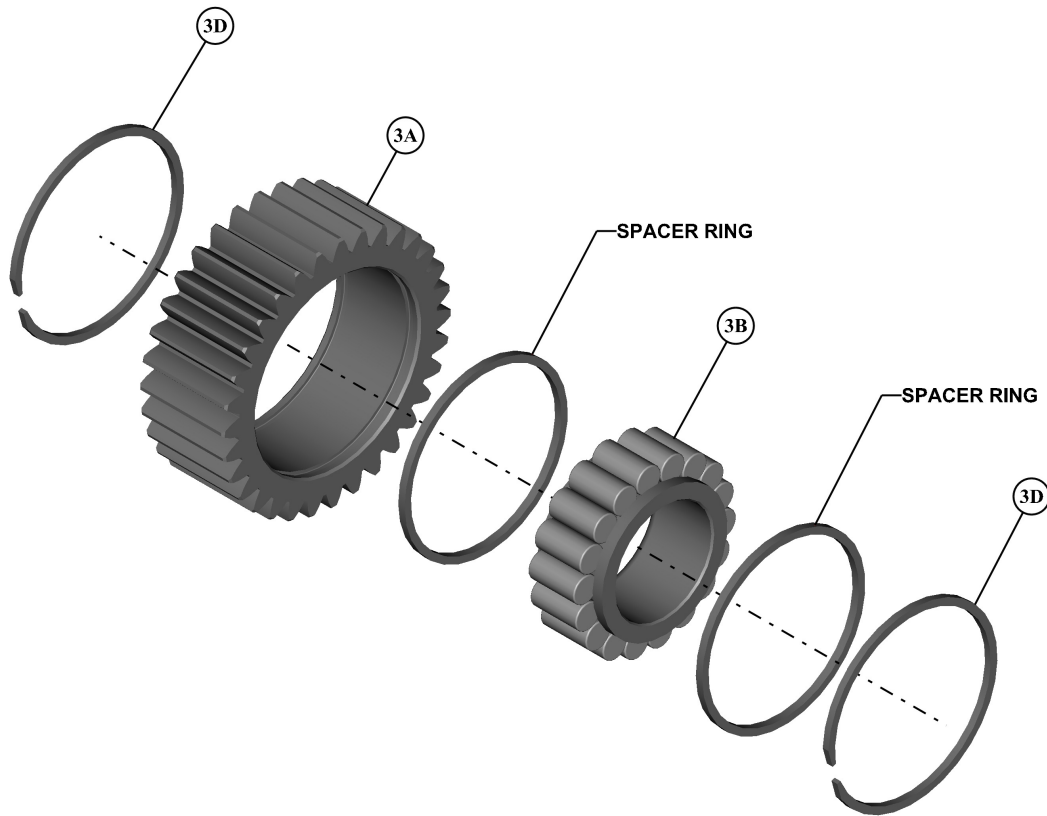
NOTE: The chamfer on the Roll Pin hole should be towards the roll pin hole in the Carrier.

8. Drive the Roll Pin (8E) into the roll pin hole in carrier and into the Planet Shaft (8D) until the end of the roll pin is flush with the outside diameter of Carrier (8A).
9. Repeat steps 4 to 8 for the remaining two Planet Gears (8F).

This concludes the Input Carrier Subassembly.

Planetary Final Drive Service Manual

Output Planet Gear Subassembly

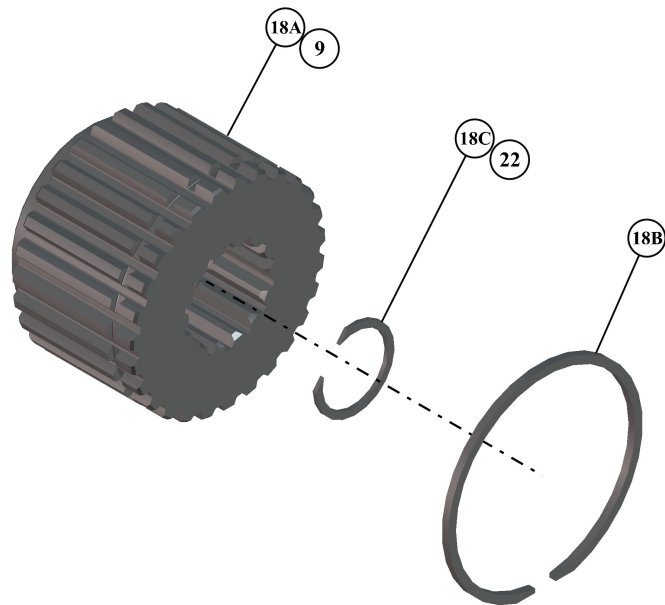
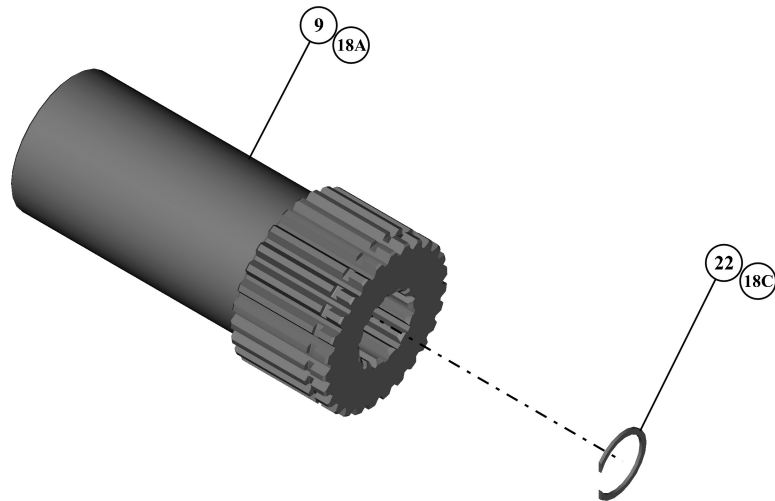


1. Apply a liberal coat of grease to the bore of the Planet Gear (3A).
- CAUTION: Safety glasses must be worn during this next steps.**
2. Install the upper Retaining Ring (3D) from groove of the Planet Gear (3A).
3. Install the Roller Bearing assembly (3B) carefully.
4. Install Spacer Rings on to the either sides of the Roller Bearing Assembly (3B).
5. Install the lower Retaining Ring (3D) from groove of the Planet Gear (3A).
6. Repeat steps 1 to 5 for the remaining three Planet Gears (4F).

This concludes the Output Carrier Subassembly.

Planetary Final Drive Service Manual

Input Coupling Subassembly



Continued on Next Page

CAUTION: Safety glasses must be worn during these next steps.

1. Install the Retaining Ring (22/18C) into Coupling (9/18A).

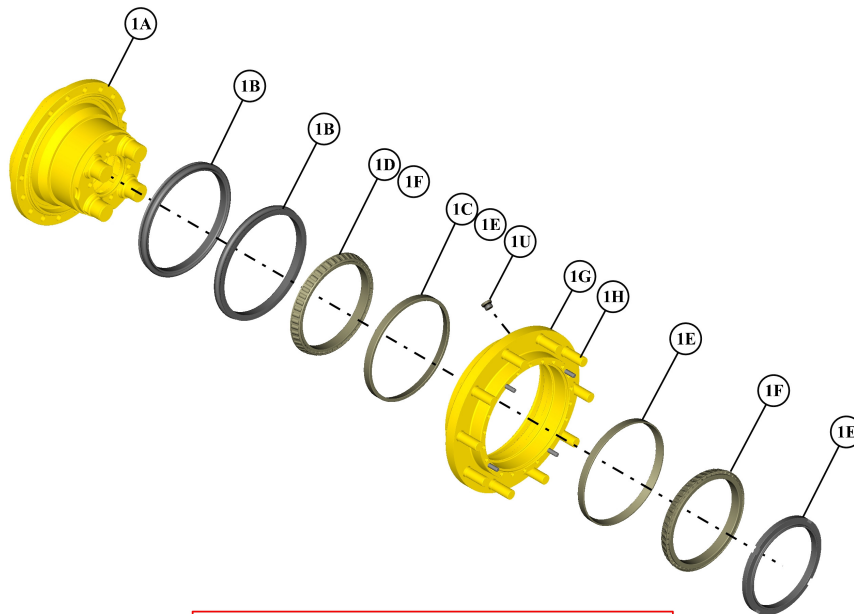
NOTE: Skip steps 2 and 3 for Assembly with Mount Adaptor.

2. Install the Retaining Ring (18B) from retaining ring groove of Coupling (9/18A).

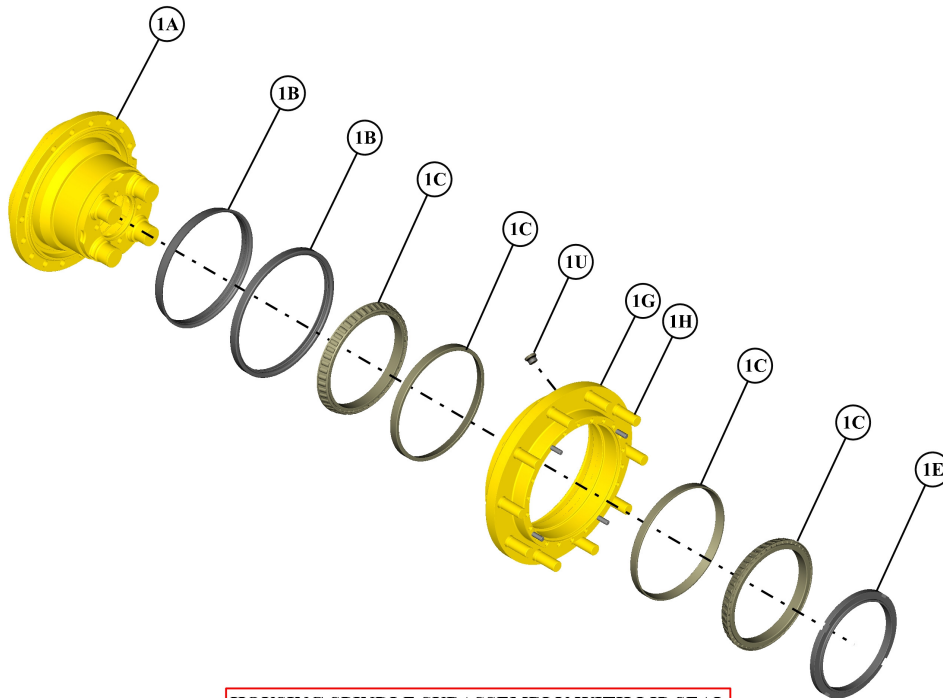
This concludes the Input Coupling Subassembly.

Final Drive Service Manual

Housing - Spindle Subassembly



HOUSING SPINDLE SUBASSEMBLY WITH FACE SEAL



HOUSING SPINDLE SUBASSEMBLY WITH LIP SEAL

Continued on Next Page

1. Using alcohol and a clean rag, wipe off bearing locations on the Housing (1G) and the Spindle (1A).
2. Press one Bearing Cup (1E) into bearing counter bore of spindle end of housing until seated against shoulder in housing. Use Tool T179926/T176834.
3. Turn Housing (1G) and press one Bearing Cup (1C/1E) using Tool T179926/T176834 into bearing counter bore of cover end of Housing (1G) making sure that it is fully seated against shoulder in the housing.
4. Install two Pipe Plugs (1U) in Housing (1G).
5. Place one Bearing Cone (1D/1F) into the Housing (1G) and, if necessary, and spray with a light coat of oil.

NOTE: Generally seals should not be reused.

NOTE: If the unit has Face Seal, refer pages 14 through 16 for detailed instructions on face seal installation. Then follow from Step 12.

NOTE: If the unit has two part lip seal follow steps below.

6. Spray the housing seal bore with alcohol, then wipe with a clean rag. Ensure there is no debris left in the bore.
7. Using alcohol and a clean rag, wipe off seal locations on the Housing (1G) and the Spindle (1A).
8. Place Spindle (1A) with flange side down onto press table and apply 80 or alcohol to seal diameter of Spindle (1A).
9. Slide the inner sleeve out of the Seal assembly (1B). Insert Inner Sleeve (1B) into seal press tool T219294. Being careful not to scratch the Seal (1B) surface. Place the seal press tool with Seal ((1B) on to the Spindle (1A). Press seal tool with inner Sleeve (1B) on to spindle (1A). When the Seal (1B) flange makes contact with the Spindle (1A) flange the Seal (1B) is fully seated. With clean rag, wipe off the Seal (1B) diameter.
10. Spray the O.D. of the outer Seal (1B) with alcohol and wipe with a clean rag. Make sure not to touch the O.D. of the Seal (1B) after it is clean and dry. Place outer Seal (1B) into Housing (1G) seal bore with spring side down. Align and place seal installation tool over the Seal (1B). Press the seal into the Housing (1G) using the seal press tool T219294. When the seal press tool makes contact with the Housing (1G) the Seal (1B) is fully seated.
11. Carefully place Housing (1G) onto Spindle (1A) so that two halves of Lip Seal (1B) contact each other. Do not allow Face Seal (1B) to contact bench or get damaged when flipping Housing (1G) over. Skip to Step 21.

NOTE: Skip below steps 12 through 19, if unit has two part lip seal.

12. Carefully place Housing (1G) onto Spindle (1A) so that two halves of Face Seal (1B) contact each other. Do not allow Face Seal (1B) to contact bench or get damaged when flipping Housing (1G) over.

Continued on Next Page

13. Place other Bearing Cone (1C) onto Spindle (1A) until it is seated in Bearing Cup (1C) in Housing (1G) and spray with a light coat of oil. If necessary, use Tool T176703 to press Bearing Cone (1C) onto Spindle (1A).
14. Install Bearing Nut (1E) onto Spindle (1A) and tighten using locknut wrench T176285. Torque Bearing Nut (1E) to 350 ft-lbs in 100 ft-lbs increments, rotate Housing (1G) in both directions, and then torque Bearing Nut to 350 ft-lbs. Rotate Housing (1G) in both directions again and torque bearing nut to 350 ft-lbs. Repeat this until Bearing Nut (1E) does not move when 350 ft-lbs of torque is applied.

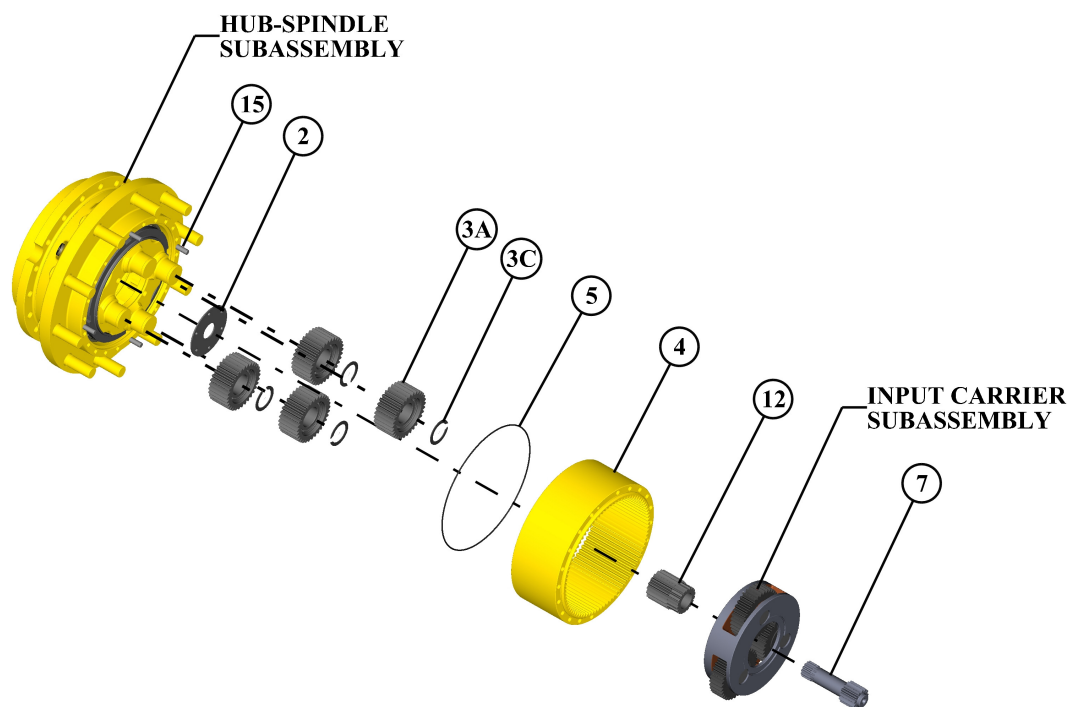
LEAK CHECK THE FACE SEAL ASSEMBLY

15. Install Cover subassembly using twenty Bolts (27).
16. Turn unit over onto its side and plug brake port in Spindle (1A) with Pipe Plug (1U) if unit does not have brakes.
17. Perform LEAK TEST as per instructions on page 9.
18. Turn unit over onto Spindle (1A) end and remove Cover subassembly.
19. Remove Bearing Nut (1E).
20. Apply Loctite 263 to first full threads of Spindle (1A) and full threads of Bearing Nut (1E) And Screw Bearing Nut (1E) onto Spindle (1A) down to top of Bearing Cone. Be sure to rotate hub as the torque is applied to properly seat the bearing. Torque the Bearing Nut (1E) to 350 ft-lbs. Rotate the Housing (1G) and recheck the Bearing Nut (1E) torque to insure that the 350 ft-lbs is maintained. Stake the Bearing Nut (1E) in three places equally spaced, into the spline.

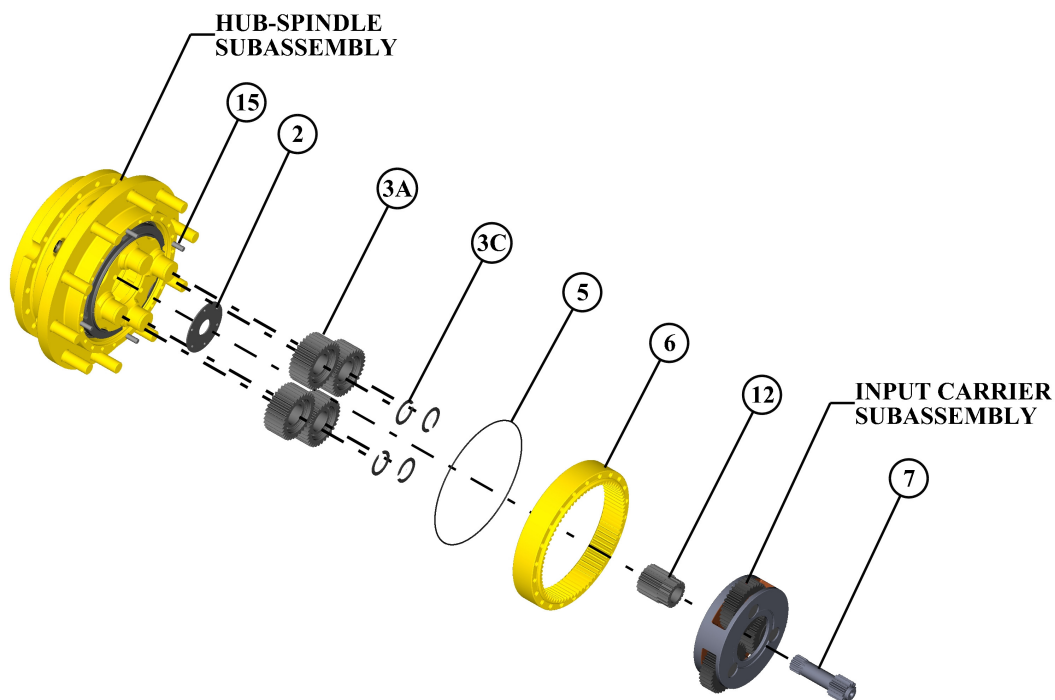
This concludes the Housing-Spindle Subassembly.

Planetary Final Drive Service Manual

Main Assembly



CW18E SERIES MODEL MAIN ASSEMBLY



CW18A & CW18D SERIES MODEL MAIN ASSEMBLY

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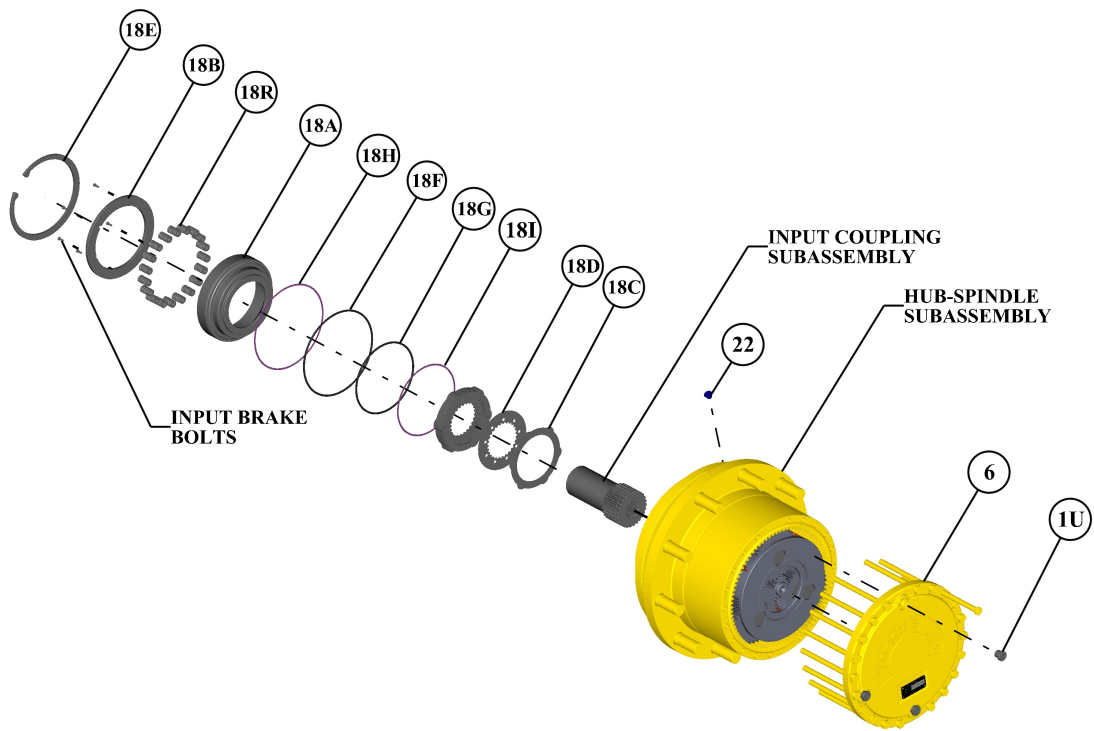
1. Place Hub-Spindle Subassembly, spindle flange end down.
2. Preheat bearing heating oven to 250 °F.
3. Install Thrust Spacer (2) into counter bore of Spindle (1A).
4. Once oven has reached 250 °F, place Planet Gear Sets (3A) into oven and leave in for 15 to 20 minutes. Do not leave gears in oven for more than 20 minutes, as metallurgical damage can occur if gears reach 250 °F. Damage can occur before gears discolor.
5. Place Hub-Spindle Subassembly on bench.
6. Remove Planet Gears (3A) from oven and immediately push one Planet Gear (3A), starting with large radius on bore of Cylindrical Roller Bearing (3B), onto each planet post of Spindle (1A) until bearing hits shoulder of planet post on Spindle (1A). If Planet Gear gets stuck on post before bearing hits shoulder of planet post, immediately press bearing the rest of the way on using T174699 pressing tool. Keep Planet Gears Sets (3A) together during assembly. One set per each Spindle (1A).

NOTE: Do not beat planet gears onto spindle posts with bar stock or hammer.

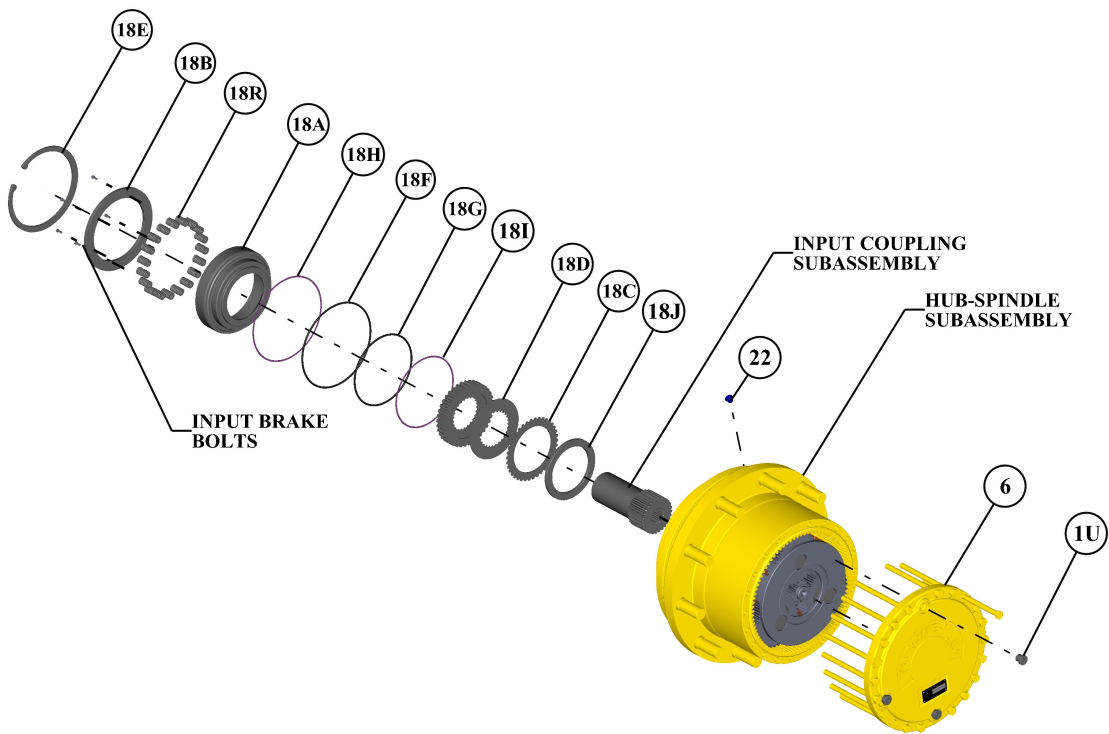
CAUTION: Safety glasses must be worn during these next steps.

7. Install Retaining Ring (3C) on each planet post of Spindle (1A).
8. Install the O-ring (5) from between the Housing (1G) and the Ring Gear (4/6).
9. Place Ring Gear (4/6) into Housing Spindle Subassembly with spline end of Ring Gear (4/6) towards Cover (6) ends of Housing (1G).
10. Install Input Carrier Subassembly into Ring Gear (4/6) with Intermediate Sun Gear (12) facing down.
11. If applicable, install Sun Gear (7) into input carrier planet gear mesh.
12. Align pipe plugs (1U) to proper location per print and install Cover Subassembly (6A) onto Housing (1G).
13. Apply Loctite 243 to bolts (27) and install them into Housing (1G) through Ring gear (4/6) and Cover Subassembly (6A).

Continued on Next Page



LOBED BRAKE DISASSEMBLY



SPLINED BRAKE DISASSEMBLY

Continued on Next Page

NOTE: Use an air gun to clean up the brake port and make sure there are no chips inside.

14. Place unit on bench such that Spindle (1A) flange side is up.
15. Insert Coupling Sub-Assembly into Spindle (1A) bore and onto Input Shaft (7).
16. Install Spacer (18J) into brake bore of the Hub-Spindle Assembly, applicable only for Splined Brake assembly
17. Starting with a Stator (18C), alternately stack and install Stators (18C) into Lobes or Splines of Hub-Spindle and Rotors (internal splines) (18D) onto splines of Input Coupling Sub-Assembly (9).
18. Stack until there are a total of 7 Stators (18C) and 6 Rotors (18D) installed.

NOTE: There should always be a stator on the top and bottom of the stack

19. Grease and install O-Ring (18G) into Spindle O-Ring groove.
20. Gradually feed Back-up Ring (18I) underneath O-Ring (18G). Using a small pick, push one end of the Back-up Ring (18I) to completely seat it in the groove. This ensures that the piston will not cut the Back-up Ring (18I) during assembly.
21. Install large Backup Ring (18H) in groove on Piston (18A).
22. Grease and install large O-Ring (18F) in the large-diameter groove towards the small Diameter end of Piston (18A) on top of the large Backup Ring (18H).
23. Press Piston (18A) into Spindle (1A) until the small end contacts the Stator (18C).
24. Insert appropriate number of springs (18R) into piston (18A). (Refer Brake Chart in page 6).
25. Place Pressure Plate (18B) on top of springs (18R).

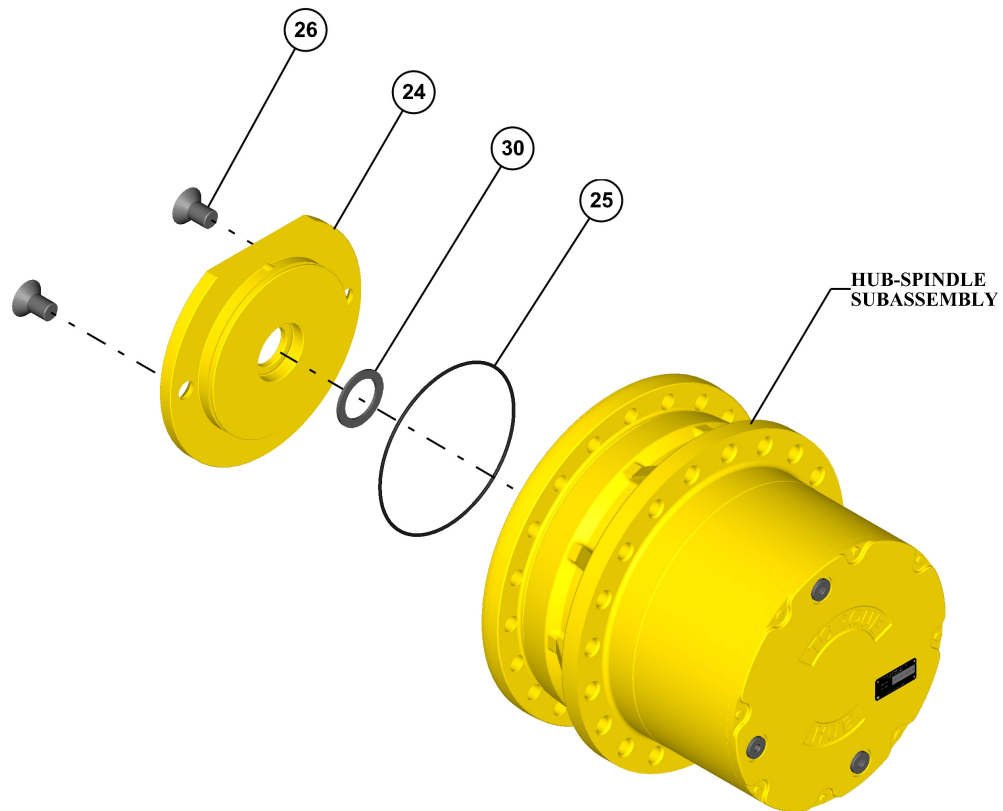
CAUTION: Safety glasses must be worn during this next step.

26. Install Input brake bolts through the Pressure Plate (18B) into Piston (18A). After springs (18R) have been compressed enough, install Retaining Ring (18E) into Spindle (1A) groove. Remove the Input brake bolts.

NOTE: Remove Input brake bolts from units when done, otherwise brake will not function.

27. The Unit should undergo brake test as per instructions on pages 5, 6, and 7.
28. Install Plastic Plug (22) into Spindle (1A).

Continued on Next Page

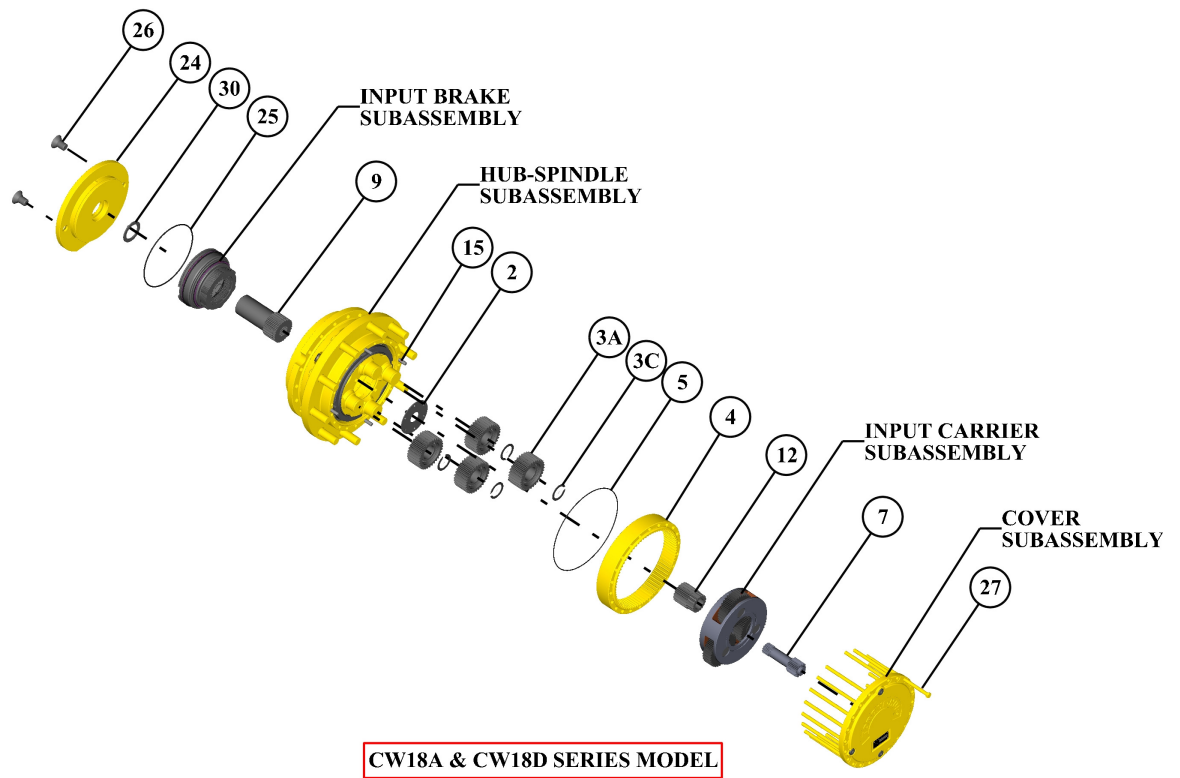
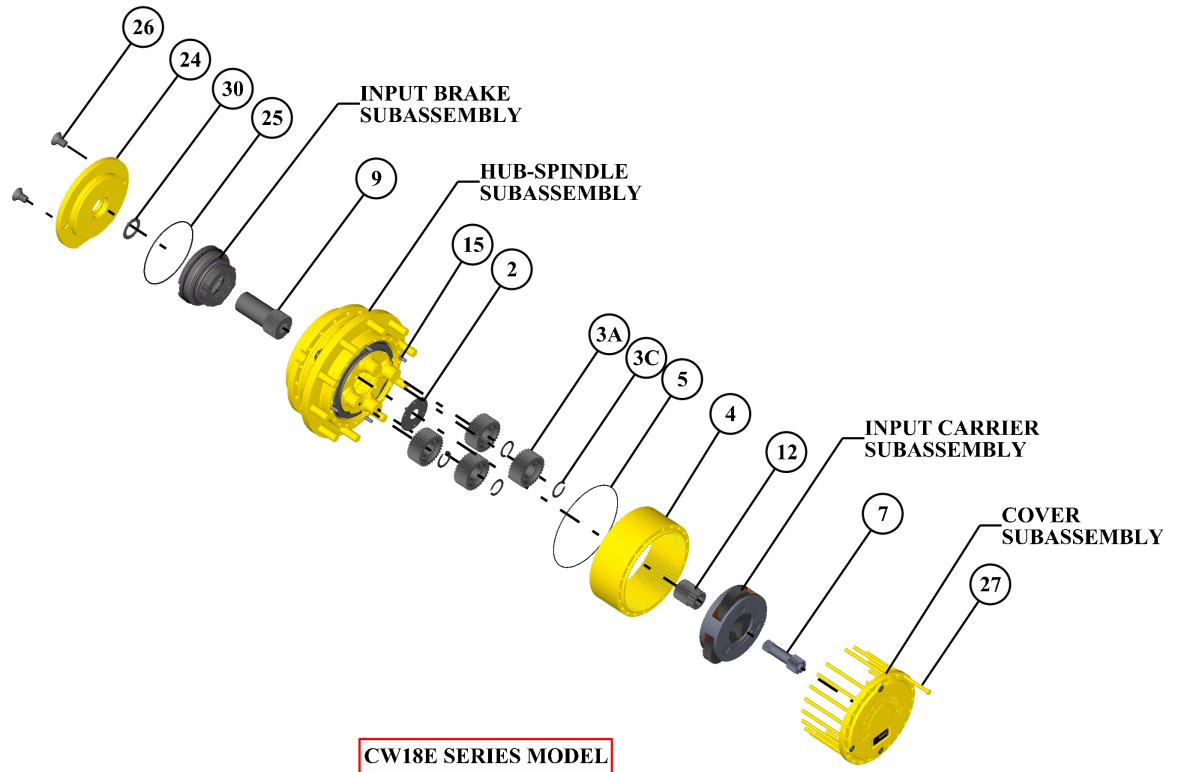


- NOTE:** Skip steps 29, 30 and 31 if unit does not have Adaptor Mounting (24).
29. Grease and Install O-Ring (25) onto O-Ring groove of Adaptor Mount (24).
- NOTE:** Skip step 30, if Thrust Washer (30) is glued onto Adaptor Mount (24)
30. Install Thrust Washer (30) onto Adaptor Mount (24).
31. Install Adaptor Mount (24) onto Spindle (1A) using Bolts (26).
32. The unit should now be leak and roll checked as per instructions on page 8, 9 & 10. The motor can be reinstalled into the gearbox for the leak check to seal it off, and the unit pressurized through a pipe plug hole on the cover.

This concludes the Main assembly.

Planetary Final Drive Service Manual

Assembly Drawing



Planetary Final Drive Repair Instructions

Parts List

Number	Qty	Description
1A	1	SPINDLE
1B	1	FACE SEAL
1C	2	BEARING CUP/ BEARING CONE
1E	1	BEARING NUT
1G	1	HOUSING
1H	10	STUDS
1U/14	2	PIPE PLUG
2	1	THRUST SPACER
3A	4	PLANET GEAR
3B	4	CYLINDRICAL ROLLER BEARING
3C	4	EXTERNAL RETAINING RING
3D	8	INTERNAL RETAINING RING
4/6	1	RING GEAR
5	2	O-RING
6	1	COVER SUB-ASSEMBLY
6A/12	1	COVER PLATE
7	1	INPUT SHAFT
8	1	CARRIER SUB-ASSEMBLY
8A	1	CARRIER
8B	12	THRUST WASHER
8C	54	BEARING NEEDLE
8D	3	PLANET SHAFT
8E	3	GROOVE PIN
8F	3	PLANET GEAR
9	1	COUPLING
10	1	THRUST WASHER
11	1	THRUST WASHER
12	1	SUN GEAR
15	4	DOWEL PIN
18	1	PISTON BRAKE SUB-ASSEMBLY
18A	1	PISTON BRAKE
18B	1	BRAKE THRUST PLATE
18C	7	STATOR
18D	6	ROTOR

Continued on Next Page

Number	Qty	Description
18E	1	INTERNAL RETAINING RING
18F	1	O-RING
18G	1	O-RING
18H	1	BACKUP RING
18I	1	BACKUP RING
18J	1	SPACER
18R	*	SPRING
22	1	PLASTIC PLUG
21B	1	EXTERNAL RETAINING RING
22	1	RETAINING RING
24	1	ADAPTOR MOUNT
25	1	O-RING
26	2	DRIVE SCREW
27/13	20	BOLT
30	1	THRUST WASHER

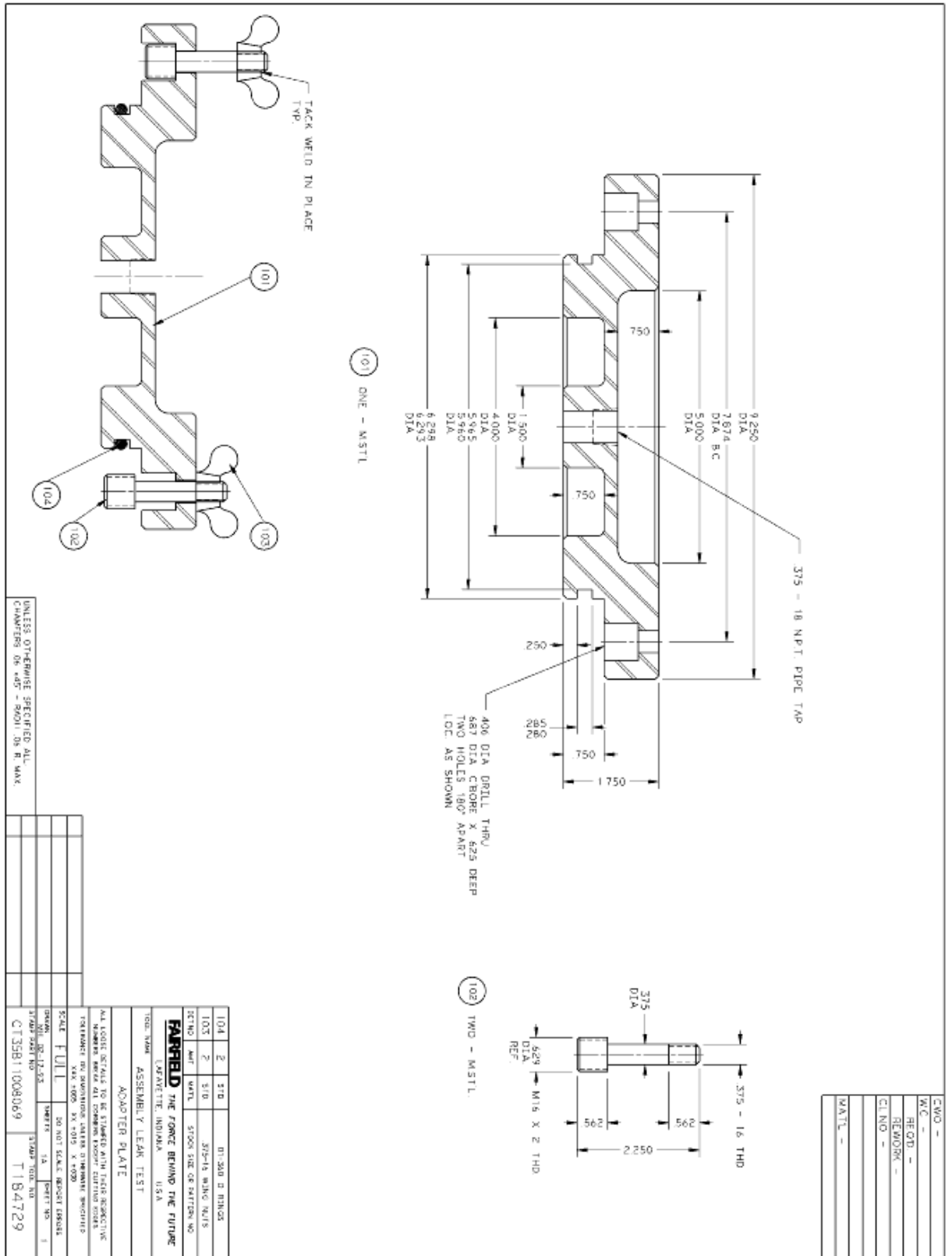
NOTE: * For Spring (18R) quantity, refer to the Brake Chart under Brake Test on page 6.

T163056- ROLL CHECKING FIXTURE

54

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T184729 – LEAK TEST ADAPTER

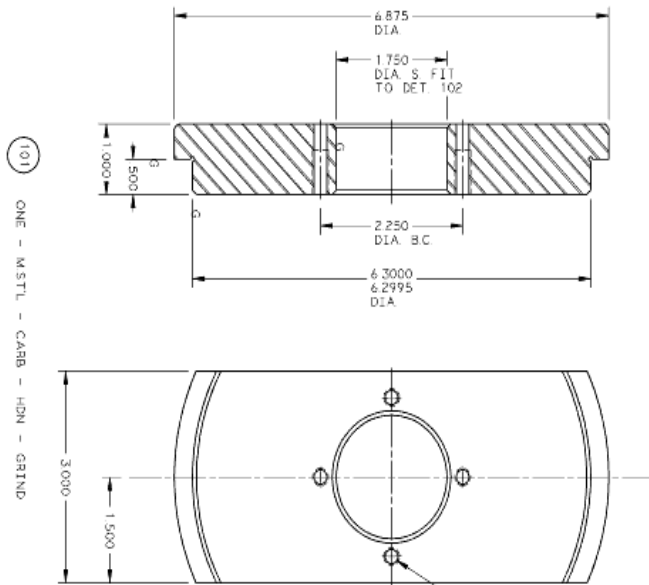
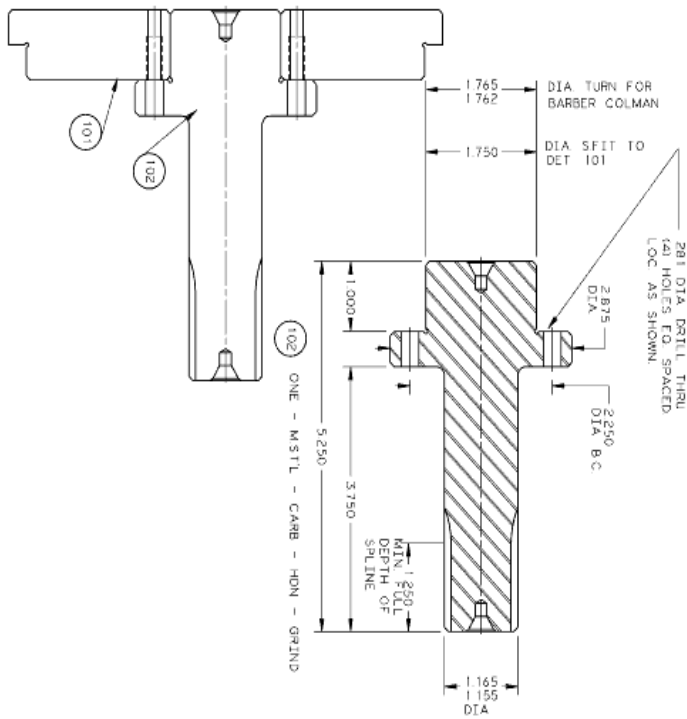


T182969 – ROLL CHECK TOOL

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TOOLS

T89132 BARBER COLMAN DRIVING DOG
T151116 BARBER COLMAN DRIVING HEAD
T61227 BARBER COLMAN HEADSTOCK CENTER
T163984 HOB

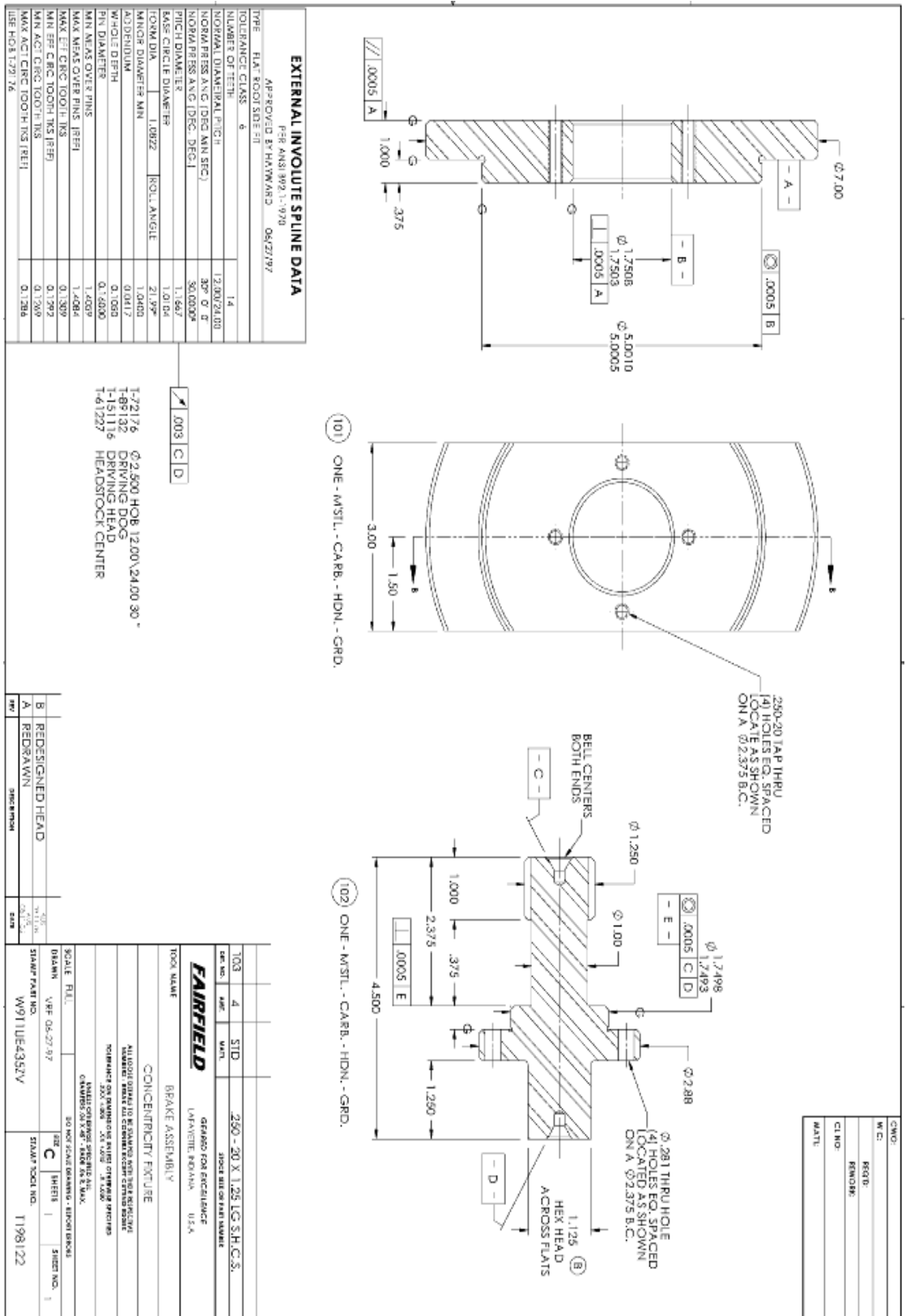


— 250 - 20 TAP X 625
DEEP (4) HOLES EQ
SPACED.

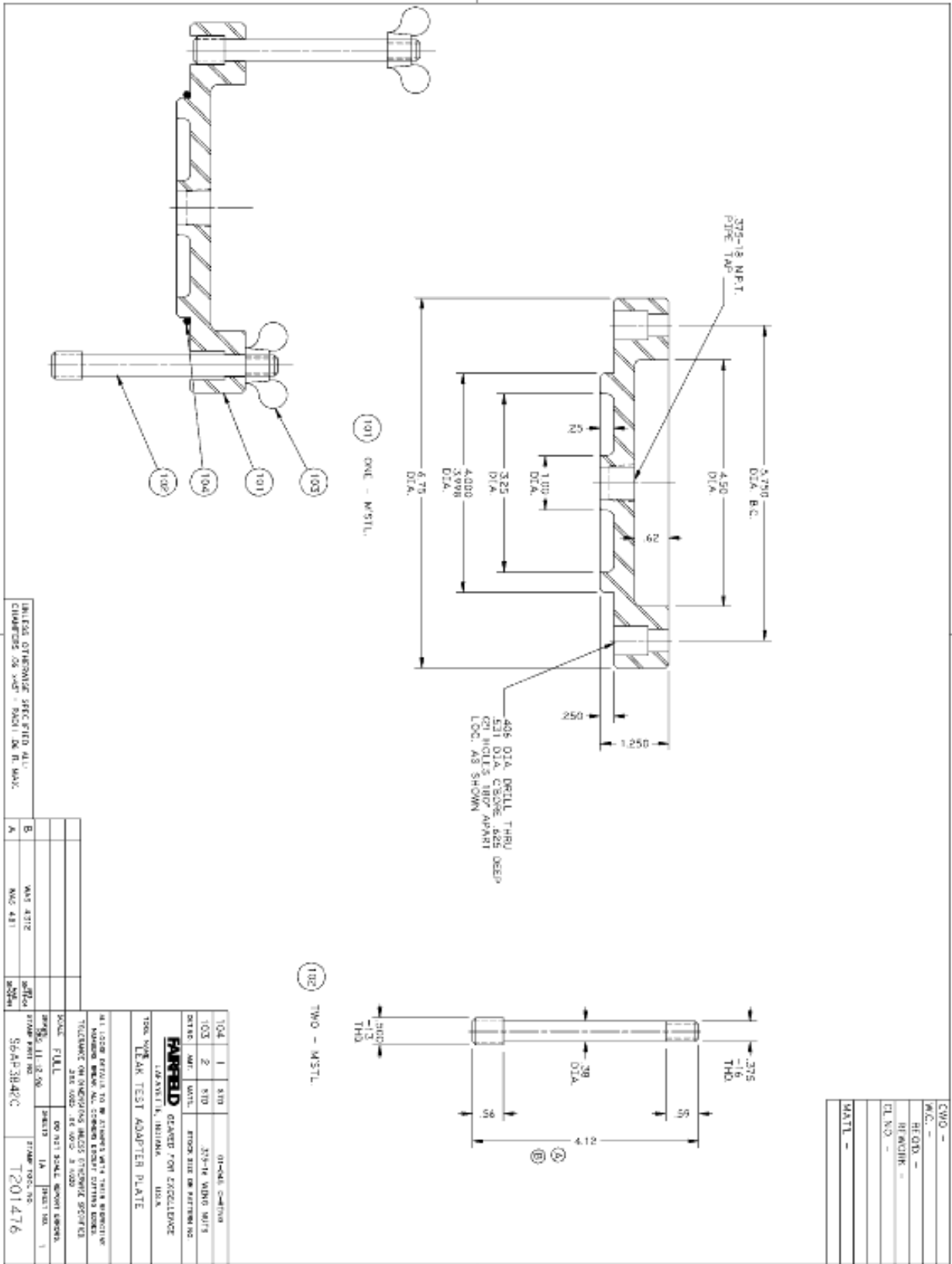
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W.C. -
RE QTY. -
REWORK -
CL. NO. -
MATL -

UNLESS OTHERWISE SPECIFIED ALL CHAMFERS .06 x45° - RADII .06 R. MAX.

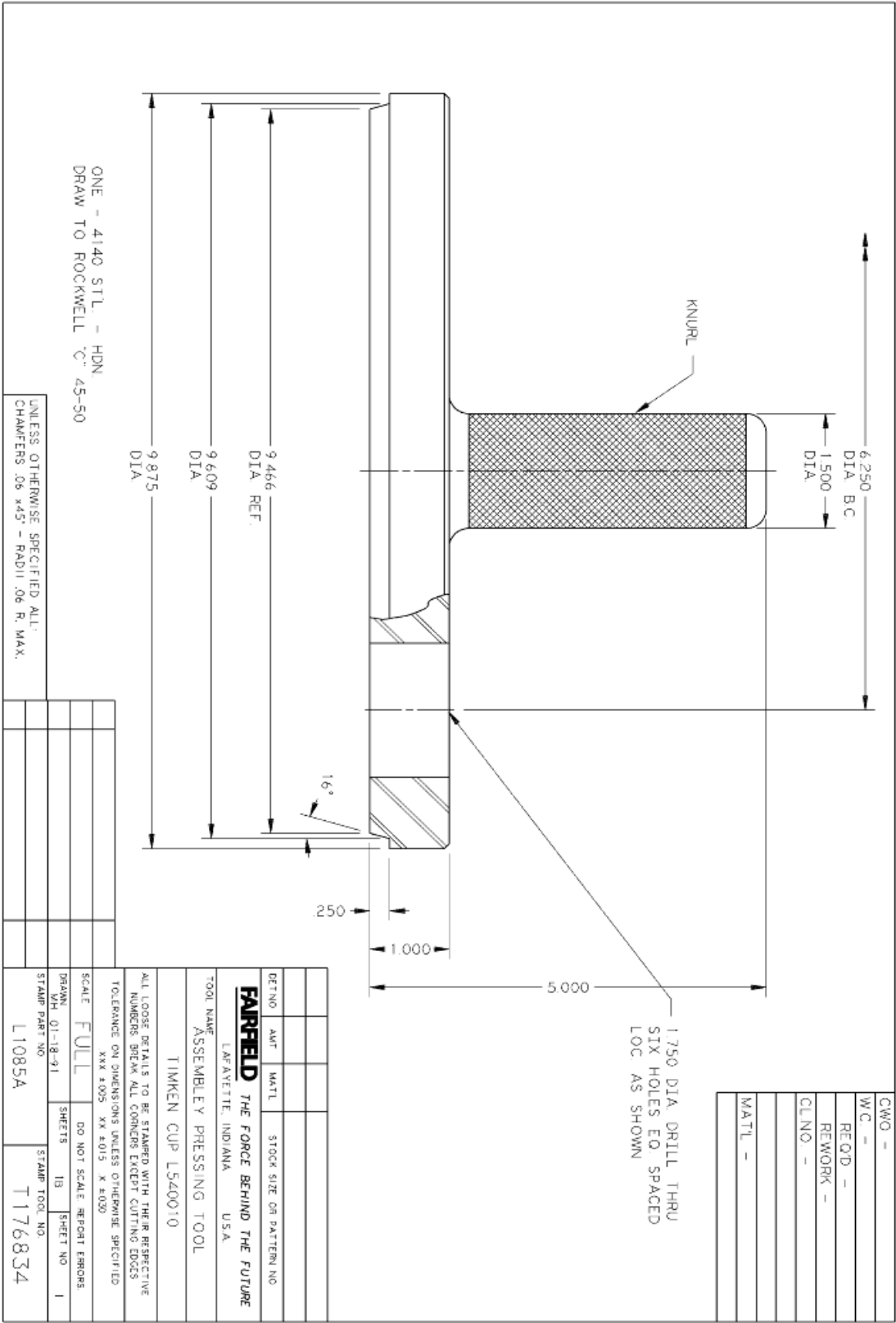
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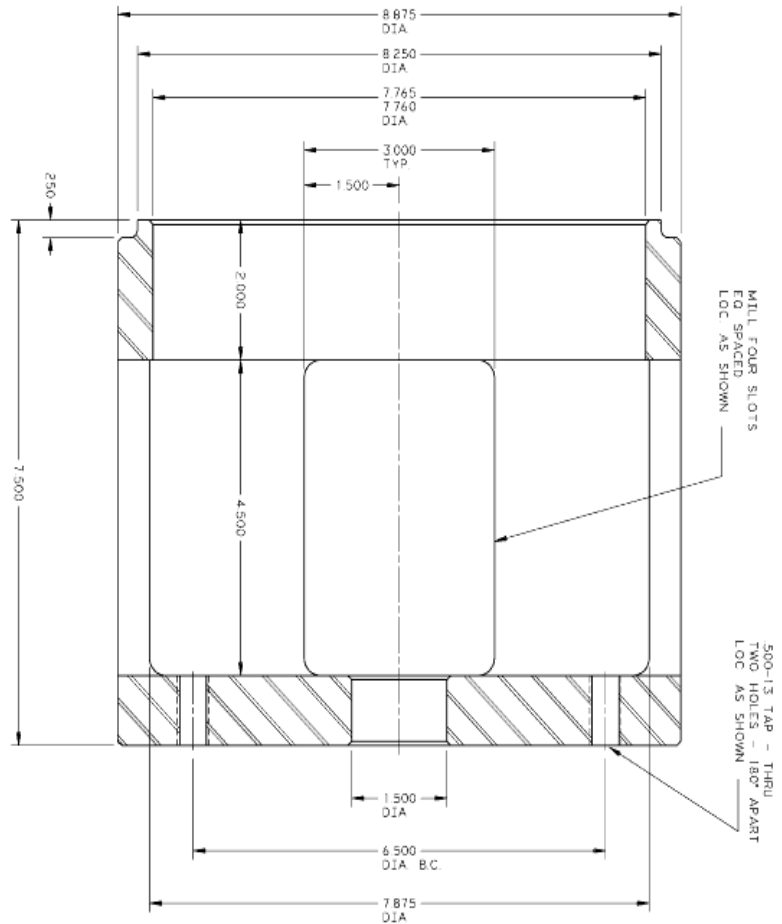
T201476 – LEAK TEST ADAPTER PLATE



T176834 – ASSEMBLY PRESSING TOOL



T176703 – BEARING CONE PRESSING TOOL



ONE - M.S.T.L. - CARB. - HDN.

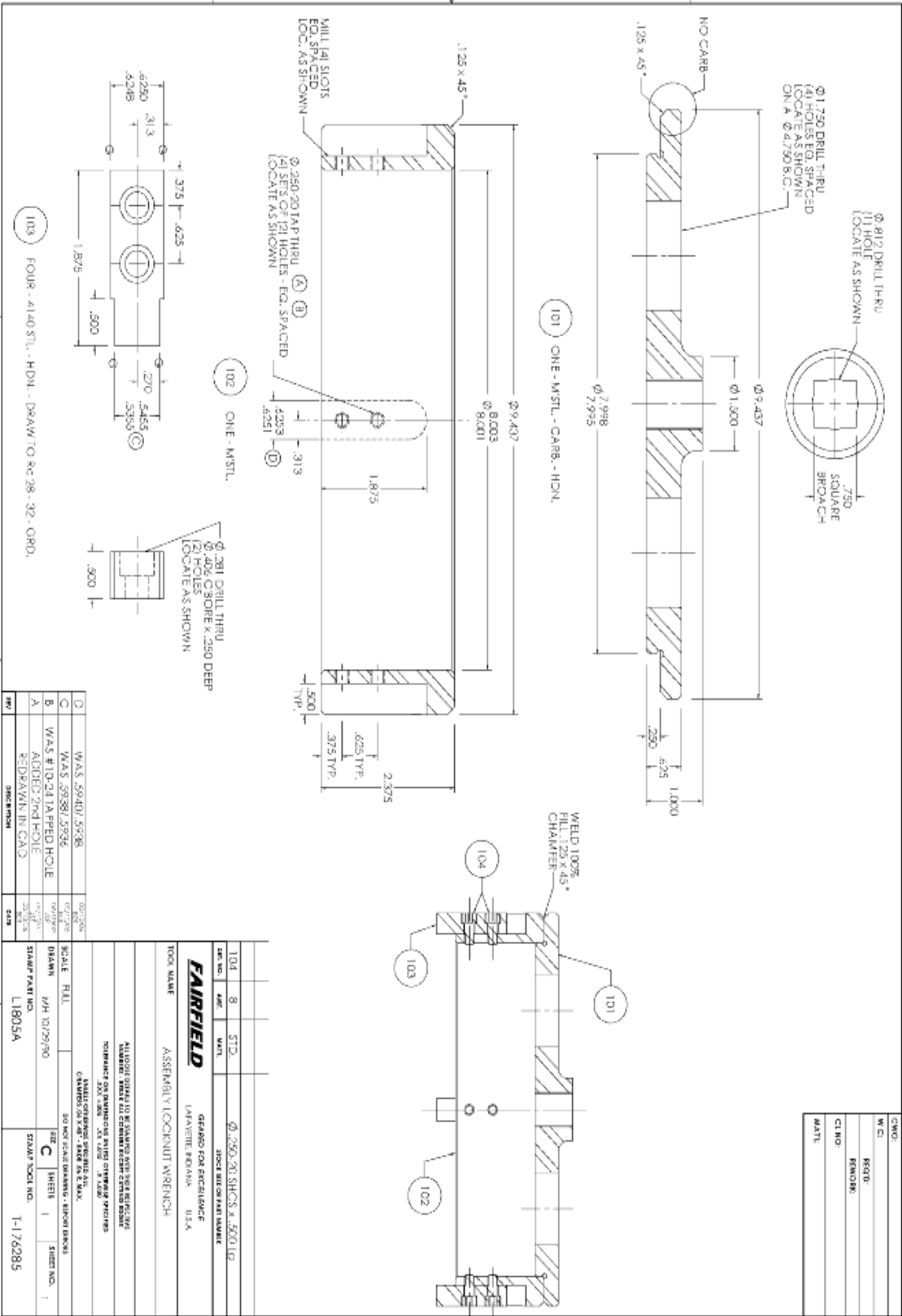
TAKEN CONE • LM739749

UNLESS OTHERWISE SPECIFIED ALL CHAMFERS .06" ± .05" - RADIUS .06 R. MAX.

SETTING		DATE		WALT		SPOON SIZE OR PATTERN NO.	
PAFIED		LATHEE, INDIANA, U.S.A.		SPOON SIZE OR PATTERN NO.			
TOOL NAME		ASSEMBLY PRESSING TOOL					
ALL TOOLS DESIGNS TO BE SHOWN WITH THE RELEVANT NUMBER BREAK-ALL CORNER EXCEPT CUTTING DIE TOLERANCE ON DIMENSIONS MUST BE SPECIFIC SCALE FULL							
STAMP NO.		SHEET NO.		SHEET NO.		SHEET NO.	
89030308A2		116703		1		1	

CWO -
WC -
REOD -
REWORK -
CL NO -
MATL -

T176285 – ASSEMBLY LOCKNUT WRENCH



T174699 – ASSEMBLY PRESSING TOOL

CWO –	
WC –	
RE OD –	
REWORK –	
CL NO –	
MATERIAL –	

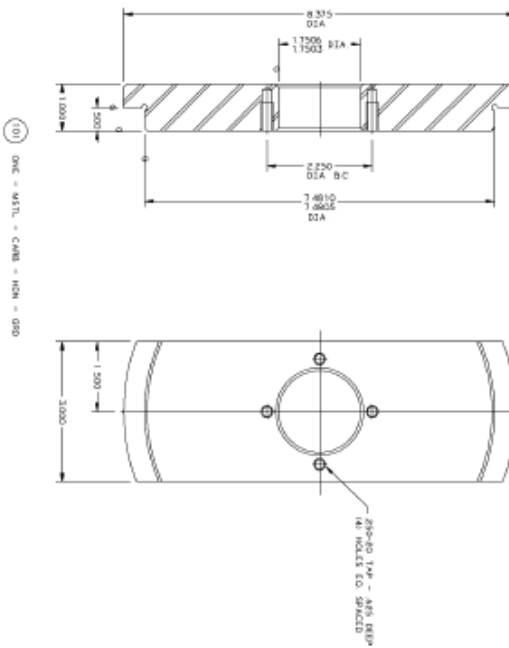
ONE – 4140 STL – HDN – DRAW TO Rc 45-50

DET NO		AMT	MATL	STOCK SIZE OR PATTERN NO	
FAIRFELD THE FORCE BEHIND THE FUTURE					
LAFAYETTE, INDIANA U.S.A.					
TOOL NAME ASSEMBLY PRESSING TOOL					
FAG SK130190-T2					
ALL LOOSE DETAILS TO BE STAMPED WITH THEIR RESPECTIVE NUMBERS BREAK ALL CORNERS EXCEPT CUTTING EDGES					
TOLERANCE ON DIMENSIONS UNLESS OTHERWISE SPECIFIED XXX ±005 XX ±015 X ±003					
SCALE FULL		DO NOT SCALE REPORT ERRORS			
DRAWN 05-02-90		SHEETS 1B	SHEET NO. 1		
STAMP PART NO. L1044A1		STAMP TOOL NO. T174699			

UNLESS OTHERWISE SPECIFIED ALL CHAMFERS .06 x45° – RADIUS .06 R. MAX.

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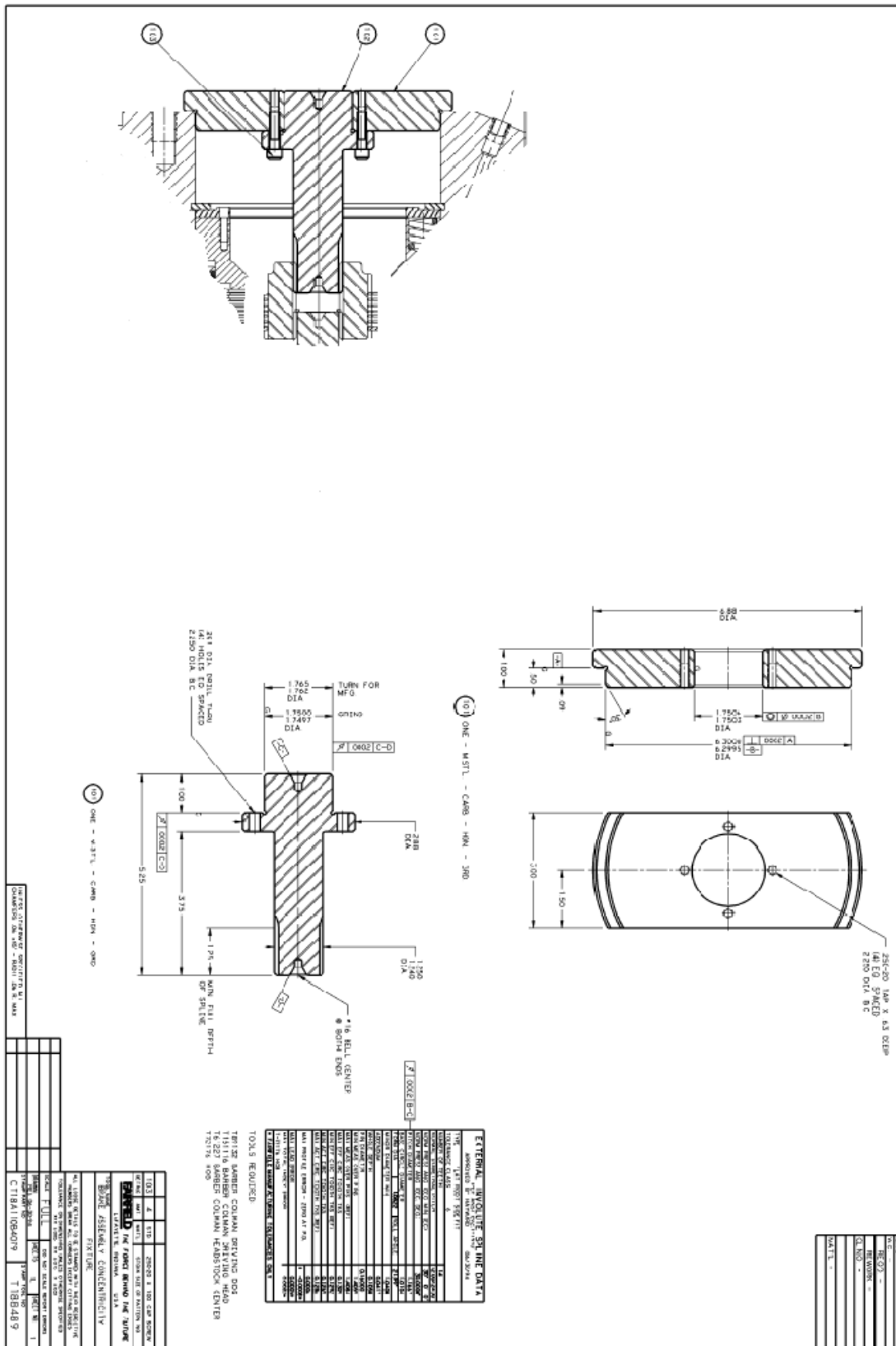
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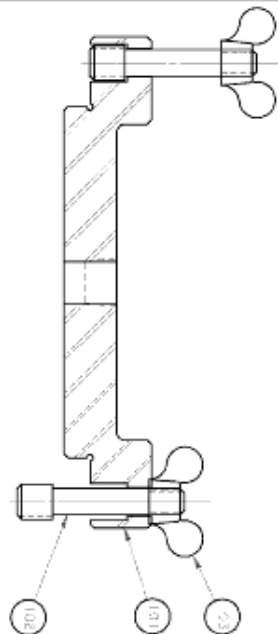
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Planetary Final Drive Repair Instructions

Contact Information

With more than 90 years of experience, Fairfield Manufacturing Co. Inc. has become the largest U.S. non-captive producer of gears, custom gear assemblies, planetary final drives and related gear products. Fairfield Manufacturing Co. Inc., headquartered in Lafayette, Indiana USA, is distinguished by our extensive design, manufacturing and applications engineering capabilities. Our 500,000 square foot plant is a modern, fully equipped manufacturing facility that includes a full service heat treat department.

Our philosophy of synchronous engineering is a partnership that matches our best and brightest people with your people to evaluate your unique requirements, and develop products and assemblies that meet your needs.

For more information, contact Fairfield Manufacturing Co Inc. today.

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Lafayette IN 47903-7940

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